### NASA TECHNICAL MEMORANDUM

(NASA-TM-X-73957-5) Larc fesign analysis PEPORT FOR NATIONAL TRANSONIC FACILITY FOR 304 STAINLESS STEEL TUNNEL SHELL. VOLUME 5S: FINITE ELEMENT AND NUMERICAL INTEGRATION ANALYSES OF THE BULKHEAD REGION

N76-33556

Unclas 07181

G3/39

Larc DESIGN ANALYSIS REPORT

FOR

NATIONAL TRANSONIC FACILITY

FOR

304 STAINLESS STEEL TUNNEL SHELL

FINITE ELEMENT AND NUMERICAL INTEGRATION ANALYSES OF THE BULKHEAD REGION

VOL, 5S

BY

JAMES W. RAMSEY, JR., JOHN T. TAYLOR, JOHN F. WILSON, CARL E. GRAY, JR., ANNE D. LEATHERMAN, JAMES R. ROOKER, AND JOHNNY W. ALLRED

This informal documentation medium is used to provide accelerated or special release of technical information to selected users. The contents may not meet NASA formal editing and publication standards, may be revised, or may be incorporated in another publication.



National Aeronautics and Space Administration

Langley Research Center Hampton, Virginia 23665



		<del>,</del>	
1. Report No.	2. Government Accession No.	3. Recipient's Catalog	No.
TM X-73957-5  4. Title and Subtitle LaRC Design Analy	usis Penort for the National	5. Report Date	
Transonic Facility for a 304	Stainless Steel Tunnel Shell -		76
Finite Element and Numerical Bulkhead Region, Vol. 5S		6. Performing Organiz	ation Code
7. Author(s) J. W. Ramsey, Jr., J. C. E. Gray, Jr., A. D. and J. W. Allred	T. Taylor, J. F. Wilson, Leatherman, J. R. Rooker,	8. Performing Organiz.	ation Report No.
9. Performing Organization Name and Address		10. Work Unit No.	
National Aeronautics and Space Langley Research Center Hampton, Virginia 23665	e Administration	11. Contract or Grant	
12. Sponsoring Agency Name and Address		13. Type of Report an Technical Memo	randum X
National Aeronautics and Space Washington, DC 20546	e Administration	14. Sponsoring Agency	Code
15. Supplementary Notes		1	
Formal Documentation of Design National Transonic Facility	n Analyses to Obtain Code App	roval of Fabrica	ted
capability was used to display A stress criteria is presented analyses were performed for ma entire tunnel circuit is presented. The major computer codes utili Systems, Inc. under NASA Contra Langley Research Center and de Structures Research Associates Heat-Transfer Computer Program Center and described in NASA T	for evaluation of the result jor critical and typical area inted. zed are: SPAR - developed by acts NAS8-30536 and NAS1-1397 scribed in NASA TN D-7179; an under NASA Contract NAS1-100 for Thermally Thick Walls" d	s of the analyses. Fatigue ana	es. Thermal lyses of the formation eloped by Transient
17. Key Words (Suggested by Author(s))	18. Distribution Statem	.nt	
Pressure Vessel Wind Tunnel Finite Element Numerical Integration Design	UNCLASSIFIED	- UNLIMITED	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	200	\$0.75

# NATIONAL TRANSONIC FACILITY TUNNEL SHELL NASA - LARC

FINITE ELEMENT
AND
NUMERICAL INTEGRATION ANALYSES
OF THE
BULKHEAD REGION

304 STAINLESS STEEL
SEPTEMBER 1976
VOLUME 5S

#### Larc CALCULATIONS

FOR THE

#### NATIONAL TRANSONIC FACILITY

TUNNEL SHELL

DATE: SEPTEMBER, 1976

APPROVED:

DR JAMES W. RAMSEY, JR., HEAD STRUCTURAL ENGINEERING SECTION

ANALYSTS:

HEAD SHELL ANALYST

PACKAGE & CONSTRUCTION MANAGER

CARL E. GRAY, SHELL ANALYST

SHELL PROGRAMMER

SHELL/THERMAL ANALYST

SHELL/THERMAL ANALYST

This report is one volume of a Design Analysis Report prepared by LaRC on portions of the pressure shell for the National Transonic Facility. This report is to be used in conjunction with reports prepared under NASA Contract NASI-13535(c) by the Ralph M. Parsons Company (Job Number 5409-3 dated September 1976) and Fluidyne Engineering Corporation (Job Number 1060 dated September 1976). The volumes prepared by LaRC are listed below:

- Finite Difference Analysis of Cone/Cylinder Junction (304 S.S.) Vol. 1, NASA TM X-73957-1.
- 2. Finite Element Analysis of Corners #3 and #4 (304 S.S.), Vol. 2S, NASA TM X-73957-2.
- 3. Finite Element Analysis of Plenum Region Including Side Access Reinforcement, Side Access Door and Angle of Attack Penetration (304 S.S.), Vol. 3S, NASA TM X73957-3.
- 4. Thermal Analysis (304 S.S.) Vol. 4S, NASA TM X73957-4.
- 5. Finite Element and Numerical Integration Analyses of the Bulkhead Region (304 S.S.), Vol. 5S, NASA TM X73957-5.
- 6. Fatigue Analysis (304 S.S.), Vol. 6S, NASA TM X73957-6.
- 7. Special Studies (304 S.S.), Vol. 7S, NASA TM X73957-7.

#### NTF DESIGN CRITERIA FOR 304 STAINLESS STEEL

#### GENERAL

THE DESIGN OF THE PRESSURE SHELL REFLECTED IN THIS REPORT SATISFIES THE DESIGN REQUIREMENTS OF THE ASME BOILER AND PRESSURE VESSEL CODE, SECTION VIII, DIVISION 1. SINCE DIVISION 1 DOES NOT CONTAIN RULES TO COVER ALL DETAILS OF DESIGN, ADDITIONAL ANALYSES WERE PERFORMED IN AREAS HAVING COMPLEX CONFIGURATIONS SUCH AS THE CONE CYLINDER JUNCTIONS, THE GATE VALVE BULKHEADS, THE BULKHEAD—SHELL ATTACHMENTS, THE PLENUM ACCESS DOORS AND REINFORCEMENT AREAS, THE ELLIPTICAL CORNER SECTIONS, AND THE FIXED REGION (RING S8) OF THE TUNNEL. THE DIVISION 1 DESIGN CALCULATIONS, THE ADDITIONAL ANALYSES AND THE CRITERIA FOR EVALUATION OF THE RESULTS OF THE ADDITIONAL ANALYSES TO ENSURE COMPLIANCE WITH THE INTENT OF DIVISION 1 REQUIREMENTS ARE CONTAINED IN THE TEXT OF THIS REPORT. THE DESIGN ANALYSES AND ASSOCIATED CRITERIA CONSIDERED BOTH THE OPERATING AND HYDROSTATIC TEST CONDITIONS.

IN CONJUNCTION WITH THE DESIGN, A DETAILED FATIGUE ANALYSIS OF THE PRESSURE SHELL WAS ALSO PERFORMED UTILIZING THE METHODS OF THE ASME CODE, SECTION VIII, DIVISION 2.

#### MATERIAL

THE PRESSURE SHELL MATERIAL SHALL BE ASME, SA-240, GRADE 304 FOR PLATE AND SA-182, GRADE F304 FOR FORGINGS THE MATERIAL PROPERTIES AT TEMPERATURES EQUAL TO OR BELOW 150°F ARE AS FOLLOWS:

(A) PLATE

YIELD = 30.0 KSI ULTIMATE = 75.0 KSI

(B) WELDS (AUTOMATIC, SEMIAUTOMATIC, OR "STICK")

YIELD = 30.0 KSI ULTIMATE = 75.0 KSI

#### OPERATING, DESIGN AND TEST CONDITIONS

THE OPERATING, DESIGN AND TEST CONDITIONS FOR THE TUNNEL PRESSURE SHELL AND ASSOCIATED SYSTEMS AND ELEMENTS ARE SUMMARIZED BELOW:

#### 1. OPERATING MEDIUM

ANY MIXTURE OF AIR AND NITROGEN

2. DESIGN TEMPERATURE RANGE

MINUS 320 DEGREES FAHRENHEIT TO PLUS 150 DEGREES FAHRENHEIT, EXCEPT IN THE REGION OF THE PLENUM BULKHEADS AND GATE VALVES INSIDE A 23-FOOT, 4-INCH DIAMETER, FOR WHICH THE TEMPERATURE RANGE IS MINUS 320 DEGREES FAHRENHEIT TO PLUS 200 DEGREES FAHRENHEIT.

#### 3. PRESSURE RANGE

•	TUNNEL CONFIGURATION	OPERATING PRESSURE RANGE, PSIA	DESIGN PRESSURES PSID
Α.	CONDITION I - PLENUM ISOLATION GATES OPEN AND TUNNEL OPERATING:		
	TUNNEL CIRCUIT EXCEPT PLENUM	8.3 to 130	A. 8 EXTERNAL B. 119 INTERNAL
	PLENUM (PLENUM PRESS- URE IS LIMITED TO .4 TO 1 TIMES THE REMAINDER OF THE TUNNEL CIRCUIT	3.3 to 130	A. 15 EXTERNAL B. 119 INTERNAL
	BULKHEAD		56 (EXTERNAL TO PLENUM)
В.	CONDITION II - PLENUM ISOLATION GATES OPEN AND TUNNEL SHUTDOWN:		
	ENTIRE TUNNEL CIRCUIT	8.3 to 130	A. 8 EXTERNAL B. 119 INTERNAL
	BULKHEAD		•
	POTIVITAD		0
С.	CONDITION III - PLENUM ISOLATION GATES AND ACCESS DOORS CLOSED:		U

PLENUM (PLENUM OPER-
ATING PRESSURE CAN
EXCEED THE PRESSURE
IN THE REMAINDER OF
THE TUNNEL CIRCUIT BY
24 PSI, BUT DOES NOT
EXCEED THE 130 PSIA
MAXIMUM OPERATING
PRESSURE)

0 to 130

A. 15 EXTERNAL B. 119 INTERNAL

BULKHEAD

A. 25 (INTERNAL TO PLENUM)

B. 119 (EXTERNAL TO PLENUM) FOR MINUS 320 DEGREES FAHRENHEIT TO PLUS 150 DEGREES FAHRENHEIT

\*C. 115.7 (EXTERNAL TO PLENUM) FOR PLUS 151 DEGREES FAHRENHEIT TO PLUS 200 DEGREES FAHRENHEIT

#### \*OPERATING PROCEDURES LIMIT PRESSURES TO THAT SHOWN.

D. CONDITION IV - PLENUM

ISOLATION GATES CLOSED AND ACCESS DOORS OPEN:

TUNNEL CIRCUIT EXCEPT 8.3 to 130 A. 8 EXTERNAL

B, 119 INTERNAL

PLENUM

PLENUM

14.7

BULKHEAD

A. 119 (EXTERNAL TO PLENUM) FOR MINUS 320 DEGREES FAHRENHEIT TO PLUS 150 DEGREES FAHRENHEIT

\*B. 115.7 (EXTERNAL TO PLENUM) FOR PLUS 151 DEGREES FAHRENHEIT TO PLUS 200 DEGREES FAHRENHEIT

<sup>\*</sup>OPERATING PROCEDURES LIMIT PRESSURES TO THAT SHOWN.

#### 4. HYDROSTATIC TEST DESIGN CONDITIONS

THE PRESSURE SHELL WAS DESIGNED FOR HYDROSTATIC TEST IN ACCORDANCE WITH THE REQUIREMENTS OF THE ASME CODE, SECTION VIII, DIVISION 1. THE TEST PRESSURES SHALL BE AS FOLLOWS. PRESSURE SHELL TEMPERATURE SHALL BE EQUAL TO OR BELOW 100°F DURING HYDROSTATIC TESTS.

CONDITION (1) - MAXIMUM INTERNAL PRESSURE CONDITION FOR THE ENTIRE TUNNEL CIRCUIT

$$PH_1 = 1.5 (119) (\frac{18.7}{18.2}) + HYDROSTATIC HEAD$$

= 183.4 PSI + HYDROSTATIC HEAD

CONDITION (2) - MAXIMUM DIFFERENTIAL PRESSURE CONDITION ACROSS THE PLENUM BULKHEADS

$$PH_2 = 1.5 \left(\frac{18.7}{18.2}\right) (119) + HYDROSTATIC HEAD$$

= 183.4 + HYDROSTATIC HEAD

$$PH_2^* = 1.5 (115.7) (\frac{18.7}{17.7}) + HYDROSTATIC HEAD$$

= 183.4 + HYDROSTATIC HEAD

\*TUNNEL OPERATION LIMITATIONS PRECLUDE PRESSURE DIFFERENTIALS ACROSS BULKHEADS IN EXCESS OF 115.7 PSI FOR BULKHEAD AND GATE TEMPERATURES IN EXCESS OF 150°F.

CONDITION (3) - MAXIMUM REVERSE DIFFERENTIAL PRESSURE CONDITION ACROSS THE PLENUM BULKHEADS

$$PH_3 = 1.5 \left(\frac{18.7}{18.2}\right) (25) = 38.5 PSI$$

THE PRESSURE SHELL EXCEPT FOR THE PLENUM SHALL BE PRESSURIZED TO 144.9 PSIG. THE PLENUM SHALL BE PRESSURIZED TO 183.4 PSIG.

#### PRESSURE SHELL STRESS EVALUATION CRITERIA

THIS CRITERIA ESTABLISHES THE BASIS FOR ANALYSIS AND DESIGN OF THE PRESSURE SHELL SO IT WILL MEET OR EXCEED ALL OF THE REQUIREMENTS OF SECTION VIII, DIVISION 1 OF THE ASME BOILER AND PRESSURE VESSEL CODE AND CAN BE STAMPED WITH A DIVISION 1 "U" STAMP.

1. SECTION VIII, DIVISION 1, DIRECT APPLICATION

(A) THE MAXIMUM ALLOWABLE STRESS (S)

 $S = 18.2 \text{ KSI} (-320^{\circ}\text{F TO } +150^{\circ}\text{F})$ 

 $S = 17.7 \text{ KSI } (-320^{\circ}\text{F TO } +200^{\circ}\text{F})$ 

(B) PRIMARY BENDING PLUS PRIMARY MEMBRANE STRESSES

THE LOCAL MEMBRANE STRESSES ARE NOT GENERALLY CONSIDERED IN SECTION VIII, DIVISION 1 DESIGNS. HOWEVER, FOR THE PURPOSE OF DESIGNING LOCAL REINFORCEMENT AT BRACKETS, RINGS OR PENETRATIONS NOT COVERED BY DESIGN BASED ON STRESS ANALYSIS, THE LOCAL SHELL MEMBRANE STRESS SHALL BE:

$$P_b + P_m \le 1.5 SE$$

NOTE: E IS JOINT EFFICIENCY

- 2. IN REGIONS OF THE PRESSURE SHELL WHEKE DIVISION 1 DOES NOT CONTAIN RULES TO COVER ALL DETAILS OF DESIGN (REF. U-2(g)), ADDITIONAL ANALYSES WERE PERFORMED UTILIZING THE GUIDELINES OF THE ASME CODE, SECTION VIII, DIVISION 2, APPENDIX 4, "DESIGN BASED ON STRESS ANALYSIS." THE BASIC STRESS CRITERIA FOR DIVISION 2 IS REPRESENTED IN FIGURE 4-130.1 AND RESTATED BELOW INDICATING ANY MODIFICATIONS OR EXCESS REQUIREMENTS APPLIED TO IT TO REMAIN WITHIN THE INTENT OF DIVISION 1 AND TO OBTAIN A DIVISION 1 STAMP.
  - A. GENERAL PRINCIPAL MEMBRANE STRESS

MAXIMUM ALLOWABLE STRESS

 $S = 18.2 \text{ KSI } (-320^{\circ}\text{F TO } +150^{\circ}\text{F})$ 

 $S = 17.7 \text{ KSI } (-320^{\circ}\text{F TO } +200^{\circ}\text{F})$ 

MAXIMUM ALLOWABLE STRESS INTENSITY

$$S_m = 20.0 \text{ KSI } (-320^{\circ}\text{F TO } +300^{\circ}\text{F})$$

B. PRIMARY GENERAL MEMBRANE STRESS INTENSITY

$$P_m \leq S_m$$

AND IN ORDER TO COMPLY WITH DIVISION 1, THE MAXIMUM PRINCIPAL MEMBRANE STRESS MUST BE:

$$P_m* \leq S$$

NOTE: THE \* IS USED TO DENOTE THAT MAXIMUM PRINCIPAL STRESSES ARE TO BE COMPUTED FOR THE GIVEN LOADING CONDITION. THE INTENT IS TO DETERMINE THE STRESSES WHICH REPRESENT THE HOOP STRESSES AND MERIDIONAL STRESSES WHICH ARE THE STRESSES USED IN DIVISION 1 COMPUTATIONS.

C. DESIGN LOADS, PRIMARY LOCAL MEMBRANE STRESS INTENSITY

$$P_{L} \leq 1.5 S_{m}$$

NOTE: LOCAL MEMBRANE STRESS INTENSITY IS DEFINED IN ACCORDANCE WITH DIVISION 2, APPENDIX 4-112(i). THE TOTAL MERIDIONAL LENGTH IS CONSIDERED TO BE 1.0 √ RT.

D. DESIGN LOADS, PRIMARY LOCAL MEMBRANE PLUS PRIMARY BENDING STRESS INTENSITY

$$P_L + P_b \le 1.5 S_m$$

E. OPERATING LOADS, PRIMARY PLUS SECONDARY STRESS INTENSITY

$$P_L + P_h + Q \leq 3 S_m$$

- 3. A FATIGUE ANALYSIS WAS CONDUCTED IN ACCORDANCE WITH SECTION VIII, DIVISION 2 WITHOUT MODIFICATION.
- 4. HYDROSTATIC TEST CONDITION DESIGN CONSIDERATIONS
  - A. PRESSURE SHELL

IN ACCORDANCE WITH DIVISION 1 OF THE ASME CODE,
DESIGN ANALYSIS OF THE PRESSURE SHELL FOR THE
HYDROSTATIC TEST CONDITION IS NOT REQUIRED.
HOWEVER, IN ORDER TO PROVIDE A SATISFACTORY
ENGINEERING DESIGN FOR THE PRESSURE SHELL SPECIAL
EMPHASIS WAS GIVEN, AS PROMPTED BY NOTE (1) OF
SECTION VIII, DIVISION 1 OF THE ASME CODE, TO FLANGES
OF GASKETED JOINTS OR OTHER APPLICATIONS WHERE SLIGHT
AMOUNTS OF DISTORTION CAN CAUSE LEAKAGE OR
MALFUNCTION. EXAMPLES OF THESE AREAS ARE THE PLENUM,
PLENUM ACCESS DOORS, PLENUM ACCESS DOOR
REINFORCEMENT, THE BULKHEADS, AND BULKHEAD FLANGES.

B. SUPPORT RINGS

DESIGN OF THE PRESSURE SHELL SUPPORT RINGS, INCLUDING

THE CORNER RINGS, FOR THE HYDROSTATIC TEST CONDITION, COMPLIES WITH THE FOLLOWING:

(A) THE COMBINED VALUE OF THE SHELL CIRCUMFERENTIAL PRESSURE STRESS, S, AND SHELL

BENDING STRESS S2, RESULTING FROM ACTION OF A

PORTION OF THE SHELL AS AN INNER FLANGE OF THE RING, SHALL NOT EXCEED 0.8 WELD YIELD STRESS:

 $S_1 + S_2 \le 0.8$  WELD YIELD STRESS,

WHERE, FOR SUPPORT RINGS NOT ANALYZED BY FINITE ELEMENT TECHNIQUES,

 $s_1 = P_H \left(\frac{R}{T}\right) + .6 P_H$ ;  $P_H$  INCLUDES HYDROSTATIC HEAD CORRECTION, AND

S<sub>2</sub> = RING BENDING STRESS AT INNER FLANGE, BASED

ON AN EFFECTIVE WIDTH OF THE PRFSSURE SHELL ACTING AS AN INNER FLAME OF THE RING OF 1.1 MULTIPLIED BY THE SQUARE ROOT OF  $\rm\,D_{\odot}$  T.

(B) THE BENDING STRESS, Sor ON THE OUTSIDE FLANGE

SHALL NOT EXCEED .9 WELD YIELD STRESS. (IN THE COMPUTER ANALYSIS ALL LOADING CONDITIONS ARE LIMITED TO .9 S<sub>v</sub> ON THE OUTER FLANGE.)

(C) BRACKETS AND SUPPORT PAD WELDMENTS

THE DESIGN FOR ALL LOADING CONDITIONS INCLUDING THE SYDROSTATIC TEST CONDITION OF THOSE PORTIONS OF BRACKETS AND SUPPORT PAD WELDMENTS WHICH ARE ATTACHED TO THE PRESSURE SHELL BUT NOT ON THE SURFACE OF THE SHELL SHALL COMPLY WITH THE REQUIREMENTS OF THE AISC CODE, I.E. MAXIMUM STRESS IN TENSION EQUALS .6  $\mathbf{S}_{\mathbf{Y}}$ , ETC.

BY DATE	SUBJECT	SHEET NOGF
CHKD. BY DATE	***************************************	JOB NO.

# VOL.59

## NTF BULKHEAD - 30455

		Page
1	SKETCH OF REGION OF ANALYSIS	
Π	DESCRIPTION OF COMPUTER CODES	2
Ш	SPAR MODEL DESCRIPTION  A CONSTRAINTS  B MODEL GEOMETRY  C LOADING CASES  Q. CASE I - GATE UALUE CLOSED  b. CASE Z - GATE UALUE OFEN  c. CASE Z - FULL PRESSURE  d. CASE 4 - GATE UALUE CLOSED  W/ STEADY STATE TEMPERATURE  e. CASE 5 - GATE UALUE CLOSED	4 13 16 18 19
	W/ TRANSIENT TEMPERATURE  D STREES AND DISPLACEMENT RESULTS  a. CASE I - run no. LAK  b. CASE 2 - run no. LEH  c. CASE 3 - run no. AAV  d. CASE 4 - run no. LAD  e. CASE 5 - run no. AAK	22 31 33

3Y CHKD. <b>B</b> Y				CT,				OF
* • u • • • • • <del></del>	*******		*******					
<u>IZ</u>	S			DESC & P				<del></del> 55
				sekling a				
	Δ.	C ON .	STRAL	NTS			<u></u>	<del></del>
	B	Моро	د <i>د</i>	OMETRY .	• 	<u> </u>		57
	С	LOAD	) NG	CASES	<del> </del>		<del></del>	<del></del> 59
		a.	CASE	1 - GA-	re value	CL056	<b></b>	60
		ю.		2 - GA-				61

CASE Z- GATE UALUE CLOSED \_\_\_\_

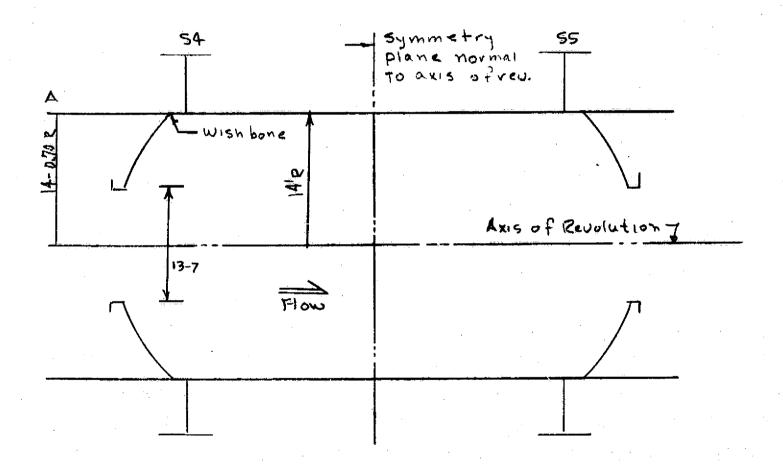
W/ 4 HR. TRANSIENT TEMP.

V 54 AND 55 RING ANALYSIS ----- 88

C.

BYDATE	SUBJECT NTF	SHEET NOOF
CHKO. BY DATE	Analysis of Bulkhead	JOB NO

Reference drawing no. LE-9444325



BY DATE	SUBJECT	SHEET NO. 2
HKD. BYDATE	***************************************	JOB NO.

L Spar; a finite element computer code developed and maintoined by Engineering Information System, Inc. Under NASA Contracts:

a. NASB - 30 536 b. NASI - 13 977.

ii SRA; a shells of Revolution Computer Code
based on a technique of foward
in tegration.
Prepared under Contract
NASI-10091,
by Structures Research Associates.

The above two codes were used to model this region of the tunner, from point A To the symmetric plane normal to the axis of revolution.

BY DATE	SUBJECT	SHEET NO. 3 OF.
CHKD. BY DATE		JOB NO.

# Spar model description.

Due to a high degree of interconnectivity in the bulkhead/ Cylindrical Shell intersection, and axial symmetry a guarter model using forty elements around the Circumference was generated.

See figure I for a computer plot of

The basic geometrie construction.

of the model also, shown on the model

for orientation purposes is the righthanded orthogonal basis used in defining;

- a. rigid body constraints
- b. model geometry
- a. direction of all discreet loods

BY DAYE	SUBJECT	SHEET NO. 4OF
CHKD. BY DATE		JOB NO

# rigid body constraints.

Constraints were imposed on the model for the following resons:

1. To maintain static equilibrium. The axial displacement on the model had to be removed, to generate a state of equilibrium. This was accomplished by modeling the effective spring rate, from the end of the model to the axis of symmetry normal to the shell, as rods. Then fixing the end of the rods on the axis of symmetry. Thus, any axial forces that were required to set up the proper stress State in the shell elements would be self generating. (see figure 2) Changing the spring rates was found to have no effect on the general structure. This simply caused the model to seek a new relative equilibrium point before setting its stress state.

BY DATE	SUBJECT	SHEET NO. 5 OF
HKD. BYDATE		JOB NO.

2. Symmetric boundary Conditions.

The (1,3) and (2,3) planes

Were modeled as planes of

Symmetry. So that in effect

a full 360° model was constructed.

See figure 1.

3. Impose Continious Cylindrical shell boundary Conditions.

on the upstream shell the rotations were removed and all translational degrees of freedom were left in the model. By removing the rotations, moments were generated to simulate a Continious Cylindrical shell.

The down stream shell had the same boundary conditions, with the exception of the rods being attached to these points.

Note: Rud elements are not capable of transmitting bending moments.

50 all bending moments had to be taken out by the shell elements.

See figure. 2.

BY DATE	SUBJECT	SHEET NO. 4 OF.
CHKD. BY DATE		JOB NO

all other degrees of freedom were left in the model.

The model had 2009 nodes or, after imposing all the boundary Conditions, alittle less than 12,000 degrees of free dom.

YDATE	SUBJECT	54757 NO. Z OF
HKD. BY DATE	***************************************	JOB NO

### Model geometry

as principle mentioned a greater model, with forty elements around the circumference and zong voice, was generated.

all elements were membrane and bending flat plates.

approximately six feet, of cylindrical shell was modeled on a ther side of the bulkhead/shell intersection. a detailed exetch of this intersection is shown in figure 3. The extra metal around the 3" rad is from a modeling stand would be rather difficult to model. Therefore, this section was modeled as shown in figure 4. leaving out this extra extiffness, by not converting may points 1 and 13 (see Figure 6), with elements that would be but the same small that would be but the same small mess; no unusally high streets were found to exist.

ORIGINAL PAGE IS DE POOR QUALITY

BYDATE	SUBJECT	SHEET NO. 8
CHKO, BYDATE		JOB NO.

Modeling of the extra shell lengths Served to main purposes: First the bulkhead / shall illder section effect on the she had no so determined. I+ was found that This discontinuity had no adverse effect or the shell, and tends to die out devi aprichly. Second a check point on the model had to be builting so that one might conclude that the approprate loads and boundary cond Hons nad been imposed. Stresses on the shell boundarys showed that little or no bending was taking place and hand calculations could predict stresses in these regions.

OF POOR QUALITY

3Y DATE	SUBJECT	SHEET NO 9OF
CHKD, BY DATE	***************************************	JOB NO

The guessess on the butchead flange were modeled as pizze elements connecting the flange to the butchead. See figure

The support ring six was modeled with plate elements and stem of the ring connected directly into the shell at prof C.

(See Figure, 4.)

OF POOR QUALITY

BY DATE	SUBJECT	SHEET NO. 10 OF
CHKD. BY DATE		JOB NO

The joint numbering sequence

Started at the top of the

flange surface, at theta pour 1 or

increased in the treta prection

first, then a my the mandian.

The joint numbering sequences

are shown in figures 21 thru 25.

The shell section properties (plate thickness) were modeled as indicated in figure 1.

Tapers were modeled as an average of the two adjacent thicknesses.

Section properties are shown in figures 26 Thru 32.

Section projectly numbers and their corresponding thickness are listed below.

Sect. No.	Thickness	I	Sect. No.	Thickness
١	4.00		19	1.25
2	5,75	-	,	7,00
3	4,50		12	4,22
4	4.00	1	: 3	1.50
5	4.00	-	14	<u>ಕ.</u> ೧೨
દ	4.00	Î	15	2,52
7	3.20		14	7 00
8	1,30	100	17	2.15
9	3,00	Transport of		



BY DATE	SUBJECT	SHEET NOOF
HKD. BY DATE		JOB NO

Material Properties used in this analysis are listed below.

### 304 Stainless Stell

P	.283 16/N3	density
a	.730×10 5 IN	Coef. of therexp.
E	28. 410 PSI	Mod. of elast.
~	. 3	Poisson's ratio.

Table 17. Selected Thermal Properties of Some Steels (See also Tables 5A and 5B, Page 12)

31/1% Nickel Steel	
Thermal Expansion Coefficient	
0 to +200°F	6.15 x 10 <sup>-6</sup> in./in./°F
Thermal Conductivity	•
—150°F (mean)	214 Stu/in./hr./ft²/°F
+68°F (mean)	253 Btu/in./hr./ft²/°F
+200°F (mean)	270 Btu/in./ht./tt²/°F
• •	
Specific Heat	
-150 to +80°F	0.798 Btu/lb./°F
+80 to +1000°F	0.147 Btu/lb./°F
9% Nickel Steel	
Thermal Expansion Coefficient	
At room temperature	5.8 x 10 <sup>-6</sup> in./in./"F
-300 to 0°F (avg.)	5.3 x 10 <sup>-6</sup> in,/in./ <sup>-</sup> F
-300 to +200°F (avg.)	5.6 x 10 <sup>-4</sup> in./in./ <sup>-</sup> F
at -300°F	4.0 x 10 <sup>-4</sup> in./in./°F
Thermal Conductivity	
-320°F	91.3 Btu/in./hr./ft²/°F
-150°F.	169.0 Btu/in./hr./ft²/°F
+68°F	189.0 Btu/in./hr./ft²/°F
+200°F -	209.0 Btu/in./hr./ft²/°F
Specific Heat	
-320 to +80°F	0.0878 Btu/lb./*F (avg.)
+80 to → 700°F	0.119 Btu/lb./°F (avg.)
304 Stainless Steel	
- Thermal Expansion Coefficient	
+32 to +212 F	9.6 x 10 <sup>-4</sup> in./in./°F
-300 to +70°F (mean)	7.3 x 10 <sup>-6</sup> in./in./ <sup>-</sup> F
+70 to +1000°F (mean)	10.0 x 10 <sup>-6</sup> in./in./°F
at -300°F	5.9 x 10 <sup>-6</sup> in./in./°F
Thermal Conductivity	
−320°F	55.4 Btu/in./hr./tt²/°F
-155°F	90.0 Btu/in./hr./ft²/°F
+70°F	113.0 Btu/in./hr./ft²/°F
⊣ 500°F	120.0 Btu/in./hr./lt²/°F
Specific Heat	1
−320°F	0.037 Btu/lb./°F (avg.)
−150°F	0.088 8tu/lb./°F (avg.)
+ 80°F	0.120 Btu/lb./°F (avg.)

U.S. Steel "Low Temperature and Cryogenie Steels" Material Manual Feb. 1967 Second Revisal Printing

ORIGINAL PAGE IS OF POOR QUALITY

YDATE	SUBJECT	SHEET NO. 13 OF
HKO. BYDATE		JOB NO.

### Loadings

The tollowing loading cases were run.

- Case 1. Gate Value Closed
- Case Z. Gate Volve open
- Case B. Full pressure
- case 4. Gate value open w/ steady state temperature distribution
- Case 5. Gate value closed w/ transient Temperature distribution.

CHKD. BY\_\_\_\_\_ DATE\_\_\_\_\_\_\_ JOB NO.\_\_\_\_\_\_\_ JOB NO.\_\_\_\_\_

To aid in explaining the different loading configuration refer to figures Zand 5.

- P is a nodal pressure applied to all nodes on the up stream shell and bulk head.
- B is a nodal pressure applied to all nodes on the down stream shell and balk head.
- P3 15 a nodal pressure applied to all nodes on the up stream and down stream shell.
- LG 15 a nodal force applied to each node around the circum fevence, except for the nodes on the 0=00 and 900 axis here the magnitude of LG 15 1/2. This load is due to the sealing force generated by the gate value, and/or dog pre loads
- LD 15 a modal force applied in pairs of nodes at dog locations.

  These loads are spring preloads or reaction to aerodynamic loads.
- 1. applied in pairs of nodes at dog locations, for value closed cond.
  - 2. applied to each node around the circumference, except for nodes at 8:00's nore the magnitude 15 1/2,

BY DATE	SUBJECT	SHEET NO. 13 OF.
CHKD. BY DATE		JOB NO

for value open conditions.

- LTF 15 a nodal force applied in pairs of nodes at dog locations.

  These loads are spring preloads
- M is a nodal moment applied to
  each node around the circumference,
  except for nodes located on the
  except for nodes located on the
  except for nodes located on the
  magnitude 15 vz.
  This moment is a result of an
  assumed misalignment of components
- E 13 a modal force applied to each mode around the circum fevence, except for modes located on the 8=0° and 0=90° axis, here the max nitude 15 1/2".

This is a boundary load due to capping off the end of the Cylinder.

BY DATE	SUBJECT	SHEET NO. ( OFOF
CHKO. BYDATE		JOB NO

Case 1. Gate value closed

For this loading configuration The following loads were applied.

P= 119.0 Psia

P= 0.0 Psia

P3= 0.0 Psia

LG= -17483.0 lbs

L5= 19500.0 lbs

LTF= -19500.0 lbs

F= 66242.0 lbs

LD= 0.0 lbs

M= 0.0 lbs

YDATE	SUBJECT	SHEET NO. OFOF
HKD. BY DATE		JOB NO

Case 2. Gate Value open / running cond.

For this loading configuration The following loads were applied:

P= 133.7 Ps1a

Pz = 53.4 Ps1a

P3 = 14.7 PSIQ

actual down stream shell pressure 57.6 psiG.

LD = 13000. 165.

LG = -5568.8 lbs.

LS = 3018.8 165.

LTF = - 19500. 165.

M = 145275. IN-165

F = 66242.0 165

3Y DATE	SUBJECT	SHEET NO. /6 OF.
CHKD. BYDATE		

Case 3. Full pressure

For this loading configuration the following loads were applied.

17 = 119.0 PSIA P2 = 119.0 PSIG 0,0 Psia P3 = 66242.0 lbs F = 0. 165 FG= 0. 165 LD= LTF = 0. 165 0. lbs L5 = -M = 0. 1N-165

This loading case was run primarly for Superposition of shell stresses on a 54 and 55 a symmetric ring load analysis.

Y DATE	SUBJECT	SHEET NO/_9OF
HKD. BY DATE		JOB NO

Case 4 Gate value open w/ steady state temperature distribution

For this loading configuration the following loads were applied:

> P. = 133.7 PSIQ Pz = 53.4 PSIQ P3 = 14.7 PSIQ

> > actual down stream shell pressure 57.6 psig.

LD= 13000. 165 LG: -5568.8 165 LS= 3018.8 165 LTF=-19500. 165 M = 145275. IN-165 F = GC 242. 165

and the temperature distribution shown in figure 72 was applied. This temperature distribution was uniform through the element thickness and around the circum ference of the model.

BY DATE	SUBJECT	SHEET NO. ZO OF.
CHKD. BYDATE		JOB NO

Case 5 Gate value closed w/ Transient temperature distribution

For this loading configuration the following loads were applied.

 $P_1 = 119$ ,  $P_31a$   $P_2 = 0.0$   $P_31a$   $P_3 = 0.0$   $P_31a$  LG = -17483.0 165 LTF = -19500.0 165 L = 19500.0 165 F = 66747.6 165 LD = 0.0 165M = 0.0 165

ORIGINAL PAGE IS OF POOR QUALITY

and the temperature distribution shown in figure 7b. was applied. This temperature distribution was uniform through the element thickness and around the circum ference of the model.

Y DATE	SUBJECT	SHEET NO. 2 OF.
HKO. BY DATE		JOB NO

#### Stress and deflection results

Presented with the summary results
for the following cases are computer
stress plots. where the circum ferential (SX)
or merdian (SY) nodal stresses are given for,
mid-surface (Surface 0),
inside Surface (Surface 1), and
outside surface (Surface 2).

The stresses are plotted for joint one of the element (reference figure 6 and 18). For the element defined by the joints 1 2 43 42, Joint one for that element 15 node 1.

Nodal stresses for a joint are given from the four surrounding elements. If any descripancies exist in the stresses for a joint due to discontinuties in the structure (ie. rings, cone cyl. junct.) The larger value is used in the interpretation of the results.

BY DATE	SUBJECT	SHEET NO. 4 OF
CHKD. BY DATE	***************************************	JOB NO

# Results Load case 1

Value Closed

The following table is a list of

The max. and min. principle

Stress es at the joints indicated.

also, in the table is the max. bending

Stress at these node and the

Surface they accure on.

Durface A = inside Surface.

Surface B = Outside Surface.

BY DATE	SUBJECT	SHEET NO. 24 OF.
CHKD. BYDATE		JOB NO.,
. <u>1914</u>	*************************************	

1				
Do Sec	Pig 6	Max PS Membrase	Min Pt Membrane	Frending /sustan
/		- 0.69	- 3.77	-4.71/B
8	3	-0.80	-3.72	-4.73/8
12	4	-0.68	-4,30	-4.75/A
20	>८	-0.03	-6.85	-6.90/A
28	38	- 1.55	-7.27	-7.49/0
32	9	-2.52	-6.3Z	-7.70/A
37	20	-3.40	-7.67	-11.73/A
41	/	-3.12	-7.46	-12.42/8
4.	52	3.42	-6.89	-8.23/B
45	3	- 3, <i>5</i> 3	-5.60	-6.27/B
5	34	-3.59	-4.92	-5.57/8
5	75	-3.62	- 4.47	-5,18/8
61	4	-3,43	- 3.60	-5.34/B
65	7	-2.10	- 3,51	-5.96/8
69	8	.00	-3.35	-5.72/B
7.	39	1.70	- 3.10	-3.91/B
70	30	4.16	- 2.90	-8.69/4
8	2/	4.84	-2.81	-11.42/A
36	2	5.10	-2.7/	-11.42/17
90	23	4.91	-2.61	-9.71/A
94	14	6.16	<i>3.</i> 3 <i>3</i>	6.17/4
98	سى3	7.01	3.33	7.16/B
11	90	15.71	7.69	15.79 /A
12	72	4.67	D f	5.82/B
15.	59	4.12	-,08	441/8
16	41	2.38	10	-
18	<u> </u>	29	13	-
18	E7	-, 05	/3	
24	-7	-,03	-7,52	-7.68/B

Y DATE	SUBJECT	SHEET NO. 25 OF.
CHKO. BY DATE		JOB NO

Shown in figures 33 thru 59 are stress plats for this loading case.

The 5tresses shown are not principle stresses however, due to the symmetry in the geometry and loads there is very little transverse sheer. Thus, these stress values could be treated as principle stresses

SHEET NO. 2-6 OF.....

Membrane Stress (intensity)
Primary local membrane stress intensity
(Mode 370)

Ji= - 3.40 KS1

Jz= - 7.67 KSI

J3: - .06 KS1

512= -3.40 - (-7.67)= 4.27 K31

623= -7.67 - (-,06)= -7.61 KS1

S31 = -.06 - (-3.40) = 3.34 KS/

5:1-7.61/= 7.61

ORIGINAL PAGE IS

Pm = 7.61- 20.0 KSI OK

Since the stress intensity is & Sm (Zoksi)
the stress intensity meets the eviterial
for general membrane stress intensity.

General memorane stress 5= 15.71 KSI (Shell mode 1190) 15.71 < 18.2 KSI OK

This region meets the stress evaluation criteria for general membrane stress.

IY DATE	SUBJECT	SHEET
HKD. BY DATE		JOB N

Primary pius Secondary Stress intensity (node 446)

In side Surface G = -4.93 KSI  $G_2 = -11.73 \text{ KSI}$   $G_3 = -0.119 \text{ KSI}$   $S_{12} = -4.93 - (-11.73) = 6.8 \text{ KSI}$   $S_{23} = -11.73 - (-.119) = -11.61 \text{ KSI}$   $S_{3} = -.119 - (-4.93) = 4.81 \text{ KSI}$   $S = \left| -11.61 \right| = 11.61 \text{ KSI}$   $P_2 + P_3 + O_4 = 35m$   $P_4 + P_5 + O_4 = 35m$   $P_6 + P_7 + O_7 = 35m$   $P_7 + P_7 + O_7$ 

Y DATE	SUBJECT	SHEET NO. 20 OF.
HKD. BY DATE		JOB NO

Outside side surface (Mode 411)

 $\begin{aligned}
& \int_{1} = -12.83 & KSI \\
& \int_{2} = -13.44 & KSI \\
& \int_{3} = 0 & KSI \\
& \int_{12} = -12.83 - (-13.44) = .61 & KSI
\end{aligned}$ 

 $5_{23} = -13.44 - 0 = -13.44 \text{ KS}$ 

531 = 0 - (-/2.83) = 12.83 K5/

J= 1-13.44 /= 13.44 KSI

12+Po+Q < 3 Sm 13.44 < GORSI OK

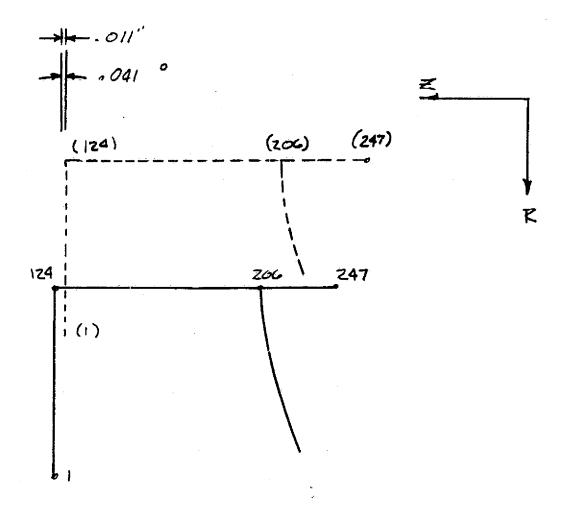
The primary plus secondary Stress intensity meets the stress evaluation criteria.

BY DATE	SUBJÉCT	SHEET NO. 29 OF
CHKO. BY DATE		JOB NO

The following sketch and table shows the relative displacement and indicates the rotation of the sealing surface

ORIGINAL PAGE IS OF POOR QUALITY

BY DATE	SUBJECT	SHEET NO. 36 OF
CHKD. BY DATE		JOB NÖ



Displacements

Joint	AR IN.	AZ IN.
}	012	0907
124	012	0797
204	0198	0800
247	0228	-,0803

Y DATE	SUBJECT	SHEET NO. 31 OF.
HKD. BY DATE		JOB NO

# Results Load Case 2

Value open / running condition

BYDATE	SUBJECT	SHEET NO. 32 OF
CHKD. BY DATE		JOB NO

Due to the decreased pressure differential across the bulkhead (76.3 psig) and The down stream pressure being far less than design (57.6 psig us. 119.0 psig design). Stresses were as expected Urry low and futher analysis of this loading condition was not warrented.

Stresses for this loading Condition:

Upstream and down stream their,

Here, the stresses are equal

To those generated from Case!

(see fig 60 thru 86 and

compare to 33 fig 59 thru

e, this region meets the

Striss evalution criticia.

Bulkhead, Here the stress are less than those generated from case 1.

Stress evoluation criteria.

For this loading condition

BY DATE	SUBJECT	SHEET NO33OF
CHKD. BYDATE		JOB NO

### Results load case 3

#### Full Pressure

Below is a sketch of the stress

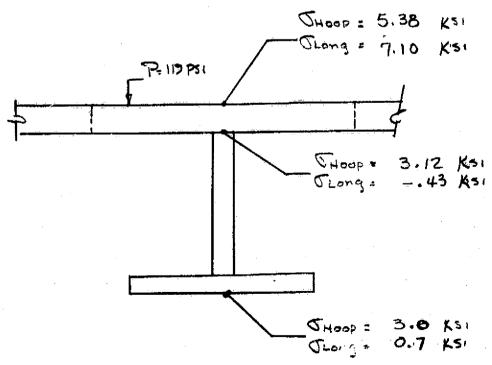
picture used on a sa and ss

asymmetric ring load analysis.

Refer to section "s4 and ss ring analysis"

for composite analysis of this

support ring region.



54 or 55

figures 87 thru 113 show the general stress picture of the model during this loading condition.

BY DATE	SUBJECT	SHEET NO. 34 OF
CHKÖ. BY DATE		JOB NO

## Results Load Case 4

Gate Value open / running condition w/ temperature distribution

( Steady State)

BY DATE	SUBJECT	SHEET NO. 35
CHKO. BY DATĘ		JOB NO.

The following table is a list of
The max, and min. principle
Stresses at the joints indicated.
also, in the table is the max.

principle bending stress at the
nodes and the surface they
accure on.

Surface A= inside surface Surface B= outside surface

BY DATE	SUBJECT	SHEET NO3 4 OF
	,	JOB NO
/ 40		·

ŧ

Dobe	Max Ps	MIN PS	Obending /surface
See Pig 6	-,14	- 1,60	-2.78 /A
<i>8</i> 3	21	70	-2.39/A
124	.47	.22	5.33/4
204	/5	-3.27	-3.35/A
288	.30	-4.56	-5.59/4
329	1.45	-4 75	-5.60/A
370	-2.04	-5.32	-9.451/A
411	-1.18	-7,00	-13.05/a
452	-1,76	-6.18	-9.70/B
493	-1.88	-4.90	-10.09/8
534	-1.96	- 3.46	-10.98/3
575	-1.95	-1.95	-11.56/8
616	-0.54	-1.89	-12 49/8
657	-0.18	-1.77	-12.54/B
698	2.41	-1.62	-10.55/8
739	-1.48	-1.59	-7.25/8
780	11.80	-1.21	13.05/A
821	4.13	-/.24	-9.98/A
862	9.98	-1,28	-15.54/A
903	14.91	-1.39	20.76/B
944	3-33	3.31	42.20/B
985	3.33	-4.27	27.93/B
1190	1845	7.69	18.57/3
1272	1.36	1.11	10.67/B
1559	2.68	1.36	11.10/B
1641	6.09	1.63	9.31/6
1805	6.04	2.04	6.20/A
1887	4.66	2.04	4.67/6
247	15	-4.60	-4.74/A

Shown in figures 114 thra 140

are stress plots for this

loading case.

The stresses shown are not

principle stresses however,

due to the symmetry in

the geometry and loads

there is very little to no

transverse shear.

thus, these stress values could

be treated as principle stresses.

SHEET NO. 20 OF.

ORIGINAL PAGE IS
OF POOR QUALITY

Membrane Stress (Intensity)
Primary local Stress intensity
(Wode 903)

J= 14.91 KS1

Oz= -1,39 KS1

03 = -,06 KS1

5,2 = 14.31 - (-1.39) = 16.3 Ks1

523 = -1.39 -6.06) = -1.33 KS1

53, = (-.06) - (+14.91) = - 14.97 KSI

J: 1/6.31 = 16.3 KSI

PM: 16.3 KS1 & 20.0 1551 OK

Since the stress intensity is & Sm (2010)
The stress intersity ments the Criteria
for general membrane stress intensity.

General Membrane Stress 5=18.45 KS1 (Shell mode 1190) 18.452 Sm KS1 or

this region meets the stress evaluation criteria for general

YDATE	SUBJECT	SHEET NO. 37 OF.
HKD. BY DATE		JOB NO

Primary plus Secondary stress intensity (mode 944)

Inside Jurface  $T_1 = -8.3c$  KS1  $T_2 = -35.54$  KS1  $T_3 = -.119$  KS1  $S_{12} = -8.36 - (-35.54) = 27.18$  KS1  $S_{23} = -35.54 - (-.119) = -35.421$  KS1  $S_{31} = -.119 - (-8.36) = 8.241$  KS1

5= 1-35. 421 KS1 = 35. 421 KS1

PL + P3 + Q < 35m

35.421 < 35m = Goks1 , on

SHEET NO. 40 OF.

JOB NO

Out side surface Stress (node 944)

J= 42.2 1C51

J2= 14,97 K51

J3 = 0. K31

5,2 = 42.2 - 14,97 = 27.23 Ksi

523 = 14,97-0 = 14,97KS1

531 = 0 - 42.2 = -42.2 ICS:

3= |-42,2 | = 42,2 k31

Pr+ Ps+Q = 38m = 601cs

42,2 < 60 1est ok

The primary plus secondary stress.
Intensity meets the stress
evaluation Criteria.

Y DATE	SUBJECT	SHEET NO. 41 OF.
HKD. BYDATE		JOB NO

## Results load case 5

Value Closed w/ transient temp. dist.

Shown in figures 141 thru 167

are stress plots for

this loading case.

The stresses shown are

not principle stresses

how ever, due to the symmetry

in geometry and loads there

is very little trans verse shear

Thus, these stress values could

be treated as principle

stresses.

IY DATE	SUBJECT	SHEET NO. 4.3 OF
CHKO. BY DATE		JOB NO

The following table is a list of Max. and MIN principle stresses at the joints indicated.

also, in the table is the max. principle bending stress at the mode and the surface the accure on.

Surface A = inside Surface Surface B = outside Surface

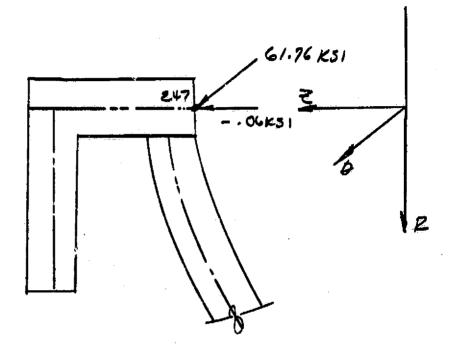
BY DATE	SUBJECT	SHEET NO. 49 OF
CHKD. BY DATE		JOB NO
$\mu \nu$		

.

**---**

1 17.89 2.66 27.41/A  83 20.80 -1.91 22.52/A  124 11.84 -2.61 15.11/A  206 -57.89 -59.47/A  288 3.58 -7.69 -9.67.76/A  329 3.13 -8.81 -10.80/B  370 .92 -5.52 -10.50/B  411 6.63 -3.84 13.38/B  452 1.71 -4.17 11.06/B  49351 -3.82 -15.25/B  534 -1.22 -3.77 -16.43/B  57587 -3.67 -16.88/B  616 -2.04 -3.59 -17.45/B  657 -3.43 -3.52 -17.62/B  739 5.15 -2.89 -14.66/B  780 12.55 -2.45 15.12/A  821 19.54 -2.29 19.97/B  862 20.58 -2.30 24.02/B  903 12.56 -2.30 25.02/A  944 3.33 2.86 45.00/B	<del></del>	·		
1789   2.66   27.41/A   88   20.80   -1.91   22.52/A   124   11.84   -2.61   15.11/A   206   -7.51   -57.89   -59.47/A   -7.51   -57.70   -6/.76/A   288   3.58   -7.69   -9.49/B   329   3.13   -8.81   -10.80/B   370   .92   -5.52   -10.50/B   411   4.63   -3.84   13.38/B   452   1.71   -4.17   11.06/B   493  51   -3.82   -15.25/B   534   -1.22   -3.77   -16.43/B   525  87   -3.67   -16.88/B   616   -2.04   -3.59   -17.45/B   657   -3.43   -3.52   -17.62/B   698   -3.43   -3.52   -17.62/B   780   12.55   -2.45   15.12/A   821   19.54   -2.29   19.97/B   862   20.58   -2.30   24.02/B   903   12.56   -2.30   24.02/B   903   12.56   -2.30   25.02/A   944   3.33   2.86   45.00/B   985   3.33   -4.89   29.13/A   1190   16.00   8.00   16.00/A   1272   4.00   .0   1559   4.0   .0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   16.87   0   0   0   16.87   0   0   0   16.87   0   0   0   16.87   0   0   0   16.87   0   0   0   16.87   0   0   0   0   0   0   0   0   0		May PS Membrase	Min Ps Mambrane	Spending /sustan
124				27.41/4
200 -0.06 -57.89 -59.47/A -7.51 -57.70 -6/.76/A 288  3.58 -7.69 -9.49/B 329  3./3 -8.8/ -10.80/B 370  .92 -5.52 -10.50/B 4//	<i>8</i> 3	20.80	-/. <del>9</del> /	22.52 /A
288	124		-2.61	15.11/4
288	Soc			-59.47/A -61.76/A
329 3./3 -8.8/ -10.80/8 370 .92 -5.52 -10.50/8 411	288			l
370 $.92$ $-5.52$ $-10.50/6$ $411$ $6.63$ $-3.84$ $13.38/8$ $452$ $1.71$ $-4.17$ $11.06/8$ $493$ $51$ $-3.82$ $-15.25/8$ $534$ $-1.22$ $-3.77$ $-16.43/6$ $575$ $87$ $-3.67$ $-16.88/8$ $616$ $-2.04$ $-3.59$ $-17.45/6$ $657$ $-3.43$ $-3.52$ $-17.62/8$ $698$ $-3.43$ $-3.52$ $-17.62/8$ $739$ $5.15$ $-2.89$ $-14.66/8$ $780$ $12.55$ $-2.45$ $15.12/A$ $821$ $19.54$ $-2.29$ $19.97/B$ $862$ $20.58$ $-2.30$ $24.02/B$ $903$ $12.56$ $-2.30$ $24.02/B$ $903$ $12.56$ $-2.30$ $29.13/A$ $1190$ $16.00$ $8.00$ $16.00/A$ $1772$ $4.00$ $0$ $1559$ $4.0$ $0$ $1687$ $0$ $0$	329	3./3	_	
411	370		_	
452   1.71	411		-3.84	
493      5/       -3.82       -/5.25/8         534       -/.22       -3.77       -/6.43/8         575      87       -3.67       -/6.88/8         616       -2.04       -3.59       -/7.45/8         657       -3.43       -3.52       -/7.62/8         698       -3.43       -3.52       -/7.62/8         739       5./5       -2.89       -/4.66/8         780       /2.55       -2.45       /5./2/A         821       /9.54       -2.29       /9.97/B         862       20.58       -2.30       24.02/B         903       12.56       -2.30       -25.02/A         944       3.33       2.86       45.00/B         985       3.33       -4.89       29.13/A         1/90        6.00       8.00        6.00/A         1772       4.00       .0         1559       4.0       .0         1687       0       0         1887       0       0	452	1.71		
534 -1.22 -3.77 -16.43/8  57587 -3.67 -16.88 /8  616 -2.04 -3.59 -17.45/8  657 -3.43 -3.52 -17.62/8  698 -3.43 -3.52 -17.62/8  739 5.15 -2.89 -14.66/8  780 12.55 -2.45 15.12/A  821 19.54 -2.29 19.97/8  862 20.58 -2.30 24.02/8  903 12.56 -2.30 -25.02/A  944 3.33 2.86 45.00/8  985 3.33 -4.89 29.13/A  1190 16.00 8.00 16.00/A  1272 4.00 .0  1559 4.0 .0  1641 3.0 .0  1805 1.0 .0	493			
57587 -3.67 -16.88 /8  616 -2.04 -3.59 -17.45 /8  657 -3.43 -3.52 -17.62 /8  698 -3.43 -3.52 -17.62 /8  739 5.15 -2.89 -14.66 /8  780 12.55 -2.45 15.12 /A  821 19.54 -2.29 19.97 /8  862 20.58 -2.30 24.02 /8  903 12.56 -2.30 -25.02 /A  944 3.33 2.86 45.00 /B  985 3.33 -4.89 29.13 /A  1190 16.00 8.00 16.00 /A  1272 4.00 .0  1559 4.0 .0  1641 3.0 .0  1887 0 0	534			. د د
616 -2.04 -3.59 -17.45 /8 657 -3.43 -3.52 -17.62 /8 698 -3.43 -3.52 -17.62 /8 739 5.15 -2.89 -14.66 /8 780 12.55 -2.45 15.12 /A 821 19.54 -2.29 19.97 / 8 862 20.58 -2.30 24.02 / 8 903 12.56 -2.30 24.02 / 8 944 3.33 2.86 45.00 / A 944 3.33 -4.89 29.13 / A 1190 16.00 8.00 14.00 / A 1272 4.00 .0 1559 4.0 .0 1641 3.0 .0 1805 1.0 .0	575	87	- 3.67	,
657 $-3.43$ $-3.52$ $-17.62/8$ $698$ $-3.43$ $-3.52$ $-17.62/8$ $739$ $5.15$ $-2.89$ $-14.66/8$ $780$ $12.55$ $-2.45$ $15.12/A$ $821$ $19.54$ $-2.29$ $19.97/B$ $862$ $20.58$ $-2.30$ $24.02/B$ $903$ $12.56$ $-2.30$ $-25.02/A$ $944$ $3.33$ $2.86$ $45.00/B$ $985$ $3.33$ $-4.89$ $29.13/A$ $1190$ $16.00$ $8.00$ $16.00/A$ $1772$ $4.00$ .0 $1559$ $4.0$ .0 $1641$ $3.0$ .0 $1805$ $1.0$ .0	616			
698 -3.43 -3.5Z -/7.62/B 739 5.15 -2.89 -14.66/B 780 12.55 -2.45 15.12/A 821 19.54 -2.29 19.97/B 862 20.58 -2.30 24.02/B 903 12.56 -2.30 -25.02/A 944 3.33 2.86 45.00/B 985 3.33 -4.89 29.13/A 1190 16.00 8.00 16.00/A 1272 4.00 .0 1559 4.0 .0 1641 3.0 .0 1805 1.0 .0	657	-3.43	-3.52	
739 5.15 -2.89 -14.66/B 780 12.55 -2.45 15.12/A 821 19.54 -2.29 19.97/B 862 20.58 -2.30 24.02/B 903 12.56 -2.30 -25.02/A 944 3.33 2.86 45.00/B 985 3.33 -4.89 29.13/A 1190 16.00 8.00 14.00/A 1272 4.00 .0 1559 4.0 .0 1641 3.0 .0 1805 1.0 .0	698	-3.43	-3.5Z	
780 12.55 -2.45 15.12/A  821 19.54 -2.29 19.97/B  862 20.58 -2.30 24.02/B  903 12.56 -2.30 -25.02/A  944 3.33 2.86 45.00/B  985 3.33 -4.89 29.13/A  1190 16.00 8.00 16.00/A  1272 4.00 .0  1559 4.0 .0  1641 3.0 .0  1887 0 0	739		-2.89	
821 19.54 -2.29 19.97/B 862 20.58 -2.30 24.02/B 903 12.56 -2.30 -25.02/A 944 3.33 2.86 45.00/B 985 3.33 -4.89 29.13/A 1190 16.00 8.00 16.00/A 1272 4.00 .0 1559 4.0 .0 1641 3.0 .0 1805 1.0 .0	780	12.55		
862 20.58 -2.30 E4.02/B 903 12.56 -2.30 -25.02/A 944 3.33 2.86 45.00/B 985 3.33 -4.89 29.13/A 1190 16.00 8.00 16.00/A 1272 4.00 .0 1559 4.0 .0 1641 3.0 .0 1805 1.0 .0	821	19.54	-2.29	
903 12.56 - 2.30 - 25.02/A 944 3.33 2.86 45.02/B 985 3.33 - 4.89 29.13/A 1190 16.00 8.00 16.00/A 1272 4.00 .0 1559 4.0 .0 1641 3.0 .0 1805 1.0 .0 1887 0 0	1	20.50		
985 3.33 -4.89 29.13/A 1190   16.00 8.00   14.00/A 1772 4.00 .0 1559 4.0 .0 1641 3.0 .0 1805 1.0 .0 1887 0 0	903	_	- Z.3o	
1190   16.00 8.00   14.00   A 1272 4.00 .0 1559 4.0 .0 1641 3.0 .0 1805 1.0 .0 1887 0 0	944	3.3≧	2.86	45.∞18
1272 4.00 .0 1559 4.0 .0 1641 3.0 .0 1805 1.0 .0 1887 0 0	985	3,33	-4.89	29.13/A
1559 4.0 .0 1641 3.0 .0 1805 1.0 .0 1887 0 0	1190	16.00	8,00	14.00 /A
1641 3.0 .0 1805 1.0 .0 1887 0 0	1272	4,00	٥.	
1805 1.0 .0 1887 0 0	1559	4.0	.0	
1887 0 0	1641	3.0	-0	
2017 01 (-17, -41.81/A	1805	1.0	٠٥.	
24706 -61.76 -61.71/B	1887	0	0	
	247	06	-61.76	-61.71 /B

Membrane Stress (Intensity)
primary local stress intensity



$$S_{1} = -0.06 KS I 
S_{2} = -61.76 KS I 
S_{3} = 0 KS I 
S_{12} = -.06 - (-61.76) = +61.70 KS I 
S_{23} = -61.76 - 0 = -61.76 KS I 
S_{3} = 0 - (-0.06) = .06 KS I 
= 1 - 61.76 / = 61.76 KS I$$

BY CHKD. BY	DATE		ET NO. 49 OF
	0	***************************************	- 1864
	-10	HATCH OPEN STR	ess Plot
5+1445	-20		
Hin. Principle =	-30		
Ä	-40		
	- 50		
	- 60		
	Join +	5 (mevidian length ci	n) )
•			
1	124	165 206 247	
			V-1

Y DATE	SUBJECTTOSLEUS	SHEET NO. 47 OF.
HKD. BY DATE		JOB NO

# Shake DOWN ANALYSIS

For Hatch OPENING AREA.

from Cese 1

$$K_c = 1.0 + \left(\frac{1-\tau}{35m}\right) \left(\frac{5n}{35m} - 1\right)$$

$$K_{c} = 1.0 + \frac{(.7)}{3(.7)} \left(\frac{62}{60} - 1\right) = 1.111$$

### THERMAL ROTCHET IN SILELL

$$\gamma' = \frac{5\tau}{5\gamma}$$

$$X = \frac{1 - 7.56}{5y} = .252$$

5y = 30 KS1

LINEAR VARIATION OF TEMPERATURE THROUGH THE SHELL WALL (CONSTANT)

$$y' = \frac{1}{.252} = 3.964$$

WITH NEW Ke factor Ke. 1.111

THE TEMPERATURE DOES NOT EXCEED: - 320°F & TEMPERATURE < 200

AND.

Membrane stress (intensity)
(away from hatch opening)

Primary local Membrane stress intensity
(Node 862)

ORIGINAL PAGE IS OF POOR QUALITY

5.2 = 20.58 - (-2.30) = 22.88 KSI 5.8 = -2.30 - (-.06) = -2.24 KSI  $5_3 = -.06 - 20.58 = -20.64 KSI$  5 = |22.88| = 22.33 KSI 9 = 22.88 + 30.0 KSI

Since the Stress intensity is < Sm (30.0xsi)
The stress intensity meets the eviteria
for general vnew-man stress intensity.

GENERAL Membrane 5tress 5 = 16.00 KS1 < S (Shell, Node 1190) 16.00 & 18.2KS1 OK

This region meets the stress evaluation or teria for deneral members stress

BYDATE	SUBJECT	SHEET NO. 50 OF.
CHKO. BY DATE	***************************************	JOB NO

PRIMBRY PLUS SECONDARY STRESS INTENSITY (HODE 944)

1N 51 DE SURFACE

(T.= 45.0 KS1

(2= 15.0 KS1

(5= -0117 KS1

 $5_{12} = 45 - 15 = 30 \text{ KS} 1$   $5_{23} = 15 - (-.119) = 15.119 \text{ KS} 1$   $5_{31} = -.119 - 45 = -95.119$  5 = 1 - 45.119 = 45.119 KS 1

PC+Pb+Q 435m 45.119 KSI & GOKSI OK

Y DATE	SUBJECT	SHEET NO. 5/_ OF
HKD. BY DATE	***************************************	JOB NO.

OUT SIDE SURFACE STRESS
(NO DE 944)

$$5.2 = 38 - (-10) = 48 | CSI$$
  
 $5.3 = -10 - 0 = -10 | CSI$   
 $5.3 = -38 = 38 | CSI$ 

THE PRIMARY PLUS SECONDARY STRESS INTENSITY MEETS THE STRESS EUALUATION CRITERIA.

Y DATE	\$UBJECT	SHEET NO. 50 OF.
HKD. BY DATE		JOB NO

THE TRANSIENT TEMPERATURE

DISTRIBUTION SHOWN IN FIGURE 75

WAS A RESOLT OF THE UPSTREAM

GAS REMAINING AT-3000F, AND

THE PLENUM GAS MAINTAINING

1000F.

THE POSSIBILITY OF THIS CONDITION EXISTING IS VERY REMOTE.

FIRST, HEATERS WOULD HAVE TO

BE EMPLOYED TO MAINTAIN THE

100°F IN THE PLENUM AREA.

SECOND THE UPSTREAM GAS

CAN NOT BE MAINTAINED

AT -300°F WITH OUT SOME

HEAT TRANSFER THROUGH

THE INSULATION.

BYDATE	SUBJECT	SHEET NO. 53 OF
CHKD. RY DATE	***************************************	JOB NO

THE GZ.KSI PEAK THERMAL STRESS

ALL THOUGH, ALLOWED BY A SHAKE DOWN

ANALYSIS, WIII PROBABLY NEVER

ACCURE. HOWEVER, THE WARM

UP CYCLE FOR THE PLENUM SHOULD

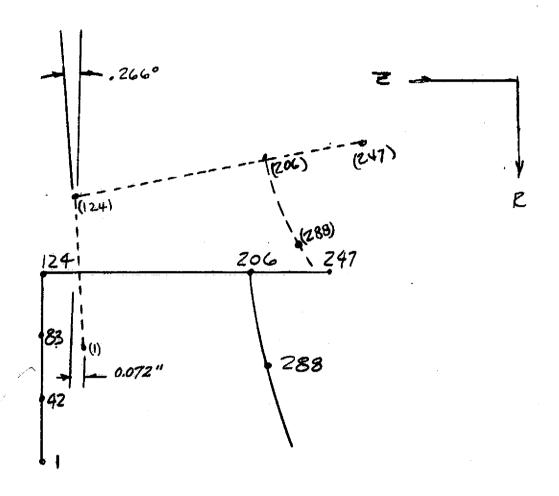
PRECLUDE ANY WARM UP TIME

IESS THAN 30 MIN.

THIS ANALYSIS WAS ALSO,
RUN ON A BETTER COMPUTER
CODE - SRA, TO VERIEY THESE
RESULTS.

SEE CASE Z UNDER SRA COMPUTER ANALYSIS, OF BULK HEAD REGION.

BYDATE	SUBJECT	SHEET NO. 2 4 OF
CHKD. BY DATE		JOB NO



Displacements

Joint	DRIN.	DZ 1N,
1	-0.120	367
124	0884	295
206	/23	299
247	135	303
288	130	310
42	108	-,341
<i>8</i> 3	0991	321

BY DATE	SUBJECT	SHEET NO. 55 OF
CHKD. BY DATE		JOB NO

#### SRA model description

SEA was used to compute a linear and a non-uncan stress and displacement response under symmetric loads.

The structure was assumed to be an axisymmetric structure.

See figure 8 for a computer plot of the meridional surface.

also, shown on the plot is the right - handed triad (5,0,2) used in defining:

a. vigid body constraints

b. Model geometry

c. direction of all discreet loads

d. location of oil bifrication points

ORIGINAL PAGE IS OF POOR QUALITY

BYDATE	SUBJECT	SHEET NO. 36
CHKD. BYDATE		JOB NO

### rigid body constraints

Boundary Conditions were imposed as shown in figure 8.

on the Upstream shell the axial displacement as well as rotations were taken out. This forced the model to gers wrate it's own axial forces when pressure applied across the bulkhead.

on the downstream shell only the rotations were taken out.

BY DATE	SUBJECT	SHEET NO 2 OF
CHKD. BY DATE		JOB NO.

## Model geometry

as previously stated the structure was axisymmetric with the exception of the bulkhead flange gussets.

These gussets were modeled as stringers - where their additional stiffness was smeared along both the backside of the fange and bulkhead in the areas of their actual location.

The model was constructed with 31 Subsections (the "t" marks on figures 8 thru 11) with stress recovery points at the begining, middle and end of each subsection.

The subsection or fictitious boundaries were inserted to:

- a. limit the subinterval length (Al cont)
- b. locate rings (indicated on figure 8 by an "o"
- c. points of discreet loads.
- d. locate a branch point in the Shell.

The second residence of the contract of the co	to the first of the control of the c	<i>-</i>
Yana BATE	SUBJECT	SHEET NO. 58 OF
other fitti de filosociologico structura de la consultada de la consultada de la consultada de la consultada d		
HKD. BY DATE		JOB NO
· · · · · · · · · · · · · · · · · · ·		

the bulkhead insulation rings were included in this model.

They were input as discreet ring properties at the ring's centroid located relative to the shells surface.

all taper thick ness were modeled as tapers.

See figure 9 which is a computer profile plot with the various section thickness noted.

ORIGINAL PAGE IS

BY DATE	SUBJECT	SHEET NO. 3.7 OF.
CHKO. BY DATE	**	JOB NO.

## Loadings

. The following cases were run:

Case 1: Gate Value Closed

Case 2. Gate Dalve Closed

W/ Transient temperature distribution.

30 min. warm up. Time

CASE 3. Gate value closed W/ TRANSIENT TEMPERATURE DISTRIBUTION.
4 HOUR WARN UP TIME

ORIGINAL PAGE IS OF POOR QUALITY

BY DATE	SUBJECT	SHEET NO.
CHKD. BYDATE		JOB NO

Case 1 Gate Value Closed

For this loading configuration the following loads were applied to the model: (see fig 11)

P= 119 psia
P= 0 psia
P3= 0 psia
LG= PiR/Z=119 x84.0/2=4998165/N

3Y DATE	SUBJECT	SHEET NO. 6 OF.
CHKD. BY DATE		JOB NO

Case Z Gate Value Closed w/ transient Temp. dist. (30 min. warm up)

For this loading Case the following loads were applied to the model:
(See figure 11)

Pi= 119,0 Psia

Pi= 0.0 Psia

Pi= 00 Psia

LG= PiR/2=119 x 84.0/2=4998 16/N

The transient temperature distributions
Us. Joint locations are shown on the
next page. See figure to to find
the relative joint location with
respect to the model

also, see figure 76

Transient temp. dist. Gate Value Closed

		alT-Tref
	0	,00000
3	0.	,000000
4	50.	.000365
6	350.	,002555
7	35G,	.002597
10	350.	.002555
14	94.	.000686
17	0.	1000000
20	0.	,000000
32	23.	.000533
35	129.	.000942
38	197.	,001438
41	20.	10001KG
45	282.	.002059
46	3as.	002227
66	307.	.002190
67	357.	.002606
78	3314.	1002438
79	30%.	1003160
93	329.	. 005365

Tref. 2000R 0 = . 730 X10-5 14/NOF or Teef = - 260 0F

ORIGINAL PAGE IS OF POOR QUALITY

The merdian and circumferential thermal strains (Os, Op) are defined to be 03 = Sixs dt, of = Sixpdt.

dadsadp = constant in the = Of = at

Case 3 Gate Value Closed w/ transient temp. dist. (4" au warm up time)

For this loading case the following loads were applied to the model: (See figure 11)

 $P_1 = 119.0$  PSIQ  $P_2 = 0$  PSIQ  $P_3 = 0$  PSIQ  $LG = P_1 R_1 / Z = 119 \times 84.0 / Z = 44998$  [b/N.

The transient temperature distributions
Us. Joint locations are shown
on the next page. See figure 10
to find the volutive joint location
with respect to the model.

also, see figure 7c.

BYDATE	SUBJECT	SHEET NO. 44 OF
CHKD. BYDATE		JOB NO

Transient - Gate Value Closed t = 4.0 Hours

		<u> </u>
JUINT	T-TREE OR	X(T-TREF)
1	o.	.0
3	o.	.0
4	55.	.000 293
6	347.	.00185
7	355	. ୦୧୮୫୨2
10	347.	,00185
14	124.	,000661
17	Ð.	.000043
20	5.	.000027
32	47.	, 000 751
35	82	. 006 437
38	140.	.000746
41	205.	1001093
45	280.	.001497
46	773.	.00189
66	300.	.001599
67	355.	.001892
78	300.	,001599
79	300.	,001599
93	323.	.001722

Tref= 200. °R X = .533 X 10-5 14/10°F Or Trei: -7600F

The merdian and circumferential

Thermal Strains (00,00) are defined to be

05= \int\_{0}^{t} \forall dt \tag{d} \tag{d} \tag{d} \tag{d} \tag{d} \tag{d}.

dods=do=Constant .:, +s= +p= dT

BY DATE	SUBJECT	SHEET NO. 65 OF
HKD. BYDATE		JOB NO.

## Stress and buckling results

Note: a definition on how to read the following data.

Figure 8 15 a reference surface

plot of the model indicating

the + 5 and & direction.

The inside surface shall be defined

as the reference surface and

the outside surface as measured

in the 2 direction away from

the reference surface.

OF POOR QUALITY

See figure 9, the inside surface
Shall shall be the continious
line with "t" indicated on it.
The outside surface will then
be the continious line next to it.

Figure 10 1s a plot showing the node locations the double numbers indicates the end then the begining of a subsegment, the triple numbers a branch points.

BY DATE	SUBJECT	SHEET NO. 66 OF
CHKD. BY DATE		JOB NO.

The integer numbers shown on figure 11 Corespond to the integers shown on figure 12.

Here they indicate the different regions of the model relative to the Continious mariginary distance.

BY DATE	SUBJECT	SHEET NO. 6 OF
CHKD BYDATE		JOB NO.

Results load case 1

Value Closed

BY DATE	SUBJECT	SHEET NO.
21		JOB NO
HKD. BY DATE	. ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	

From Computer van AGZ and Shown in figures 12, 13, 14 ave Stress plots of Thoop and Tmeridian Us. Meridian distance.

of the inside and outside surface stresses, in the circum formatian and meridian directions.

Figure 13 outside Surface stresses in the circumferential and meridian directions.

Figure 14 Inside Surface Stresses in the aircum ferential and merdian directions

ORIGINAL PAGE IS OF POOR QUALITY Primary plus Secondary stress intensity

Inside Surface.

SHEET NO. 70

Out side Surface

the primary plus scrondary stress intensity meets the stress evaluation exiteria.

Membrane Stress (intensity) Primary local Membrane stress intensity

( See fig 12 )

J. = 5. KS1

Tz = -3, KS!

( -. 06 KS1

5,2= 5-(-3)= B.0 KSI

523 = - 3. - (-,06) = - 2.94 KSI

53, = -, oc - 5, = -5, oc 1651

5= | 8.0 | = 8.0 KS1

Pm= 8.0 x 20.01681 0K

Dince the stress intensity is < Sm(201831) The stress intensity meets the criteria for general membrane stress intensity

General Membrane 5 tress S= 15.53 KS1 < 182=5

This region meets the Stress evaluation criteria for general Membrane Stress.

B. furcation bucking of bulkhead.

There were several runs made to determine the critical load factor for the Bulkhead region. Here the sprestressed "Value Closed" Condition was run. The loading condition was run. The loading condition generated the maximum spressure differential across the bulkhead (P=119 PS19). Early attempts to extract an eigenvalue generated megative eigenvalues biturcating on the shell.

A step wise proceedure of shifting the eigen value was adopted untill a positive eigenvalue was adopted untill a positive eigenvalue was generated.

The following table sumarizes the eigen salue solution, which indicates that the minimum critical load factor of 26.58 when applied to the 119PSI external pressure would require a pressure of 3163, psi before buckling would accure.

ORIGINAL PAGE IS

BY DA\&	SUBJECT	SHEET NO. 73OF
CHKD. BYDATE		JOB NO.

Value Closed loading Condition
Bifurcation Buckling load factor

Harmonic	λ	Location	Node
Z	26.58	Bulkhead	14
3	28.89	ŧ:	14
4	35.17	tt	1
5	41.78	ļ.	15,16
G.	48.85	73	17
7	56,30	t <u>i</u>	17
8	- 43.52	5hell	51,52
9	_32.03	, 1	<i>31,52</i> <b>_</b>
10	-25,46	٧١ .	51,52

RYDATE	SUBJECT	SHEET NO. 74 OF
CHKD. BYDATE		JOB NO.,

also, along with the linear analysis a mon-lunear analysis was performed with a load factor of 26 on a prestressed structure, using a 119 psi pressure, an estimated load factor of  $\chi_c = 25.30$  was found.

which is in good agreement with the linear bifurcation buckling analysis.

BY	SUBJECT	SHEET NO 0F
CHKO. BY DATE		JOB NO

# Results load Case 2

Gate Value Closed w/ Tran, Temp dist.

W/ 30 Min warm up time

YDATE	SUBJECT	SHEET NO OFOF
		JOB NO

From Computer run NMW and

Shown in figures 15,16 and 17 are

Stress plots of Thoop and Emeridian

Us. Meridian length.

Figure 15 18 a numerical average of the inside and outside surface stresses in the circumferential and meridian directions

Figure 16 out side surface stresses in the circum ferential and meridian directions.

Figure 17 inside surface stresses in the circumferential and meridian directions.

YDATE	SUBJECT	SHEET NO. 77 OF.
HKD. BY DATE		JOB NO

MEMBRANE STRESS (INTENSITY)

PRIMARY JOCAL MEMBRANE STRESS INTENSITY

5,= 22.0 KSI

Oz= -3.0 KS1

53= -106 KSI

5,2 = 22 - 3 = 25 KSI

S23 = -3 - (-.06) = - 2.94 KS1

531 = -106 - 22 : - 22.06 KS (

5 = | 25.0 | = 25KSI

PL = 254 30KS1 = 1.55m DR

VET = 20.6" EXCURSION LENGTH = 4"

Since THE STRESS INTENSITY IS < 1.55m THE STRESS INTENSITY MEETS THE CRITERIA FOR COCAL MEMBRANE STRESS INTENSITY.

GENERAL MEMBRANE STRESS 5=15.5KS1 & 18.7 = 5 ok

THIS REGION MEETS THE STRESS EUAGUATION CRITERIA FOR GENERAL MEMBRANE STRESS.

BYDATE	SUBJECT	SHEET NO. 78 OF
CHKD. BYDATE		JOB NO

#### THERMAL STRESSES

# PRIMARY PLUS SECONDARY STRESS INTENSITY

INSIDE SURFACE

J= 20.0 KS1

J2 = - 95.5 KS1

J3= -. 119 KS1

5,z = 20 - (-45.5) = 65.5 FSI

523 - - 95.5 - (-.119) = 45.38 KS1

531 = -119-20 = -20,117 KS1

5 = /65.5 /KS/

SEE SHAKE DOWN ANALYIS
FOR THIS TRANSIENT
TEMPERATURE PROFILE
57RESS ANALYSIS, THAT
WAS RUN ON SPAR.

ST= 118KS1 65.5 4 118KS1 OK

BY DATE	SUBJECT	SHEET NO. 79 OF
SHKO. BY DATE		JOB NO

#### THERMAL STRESSES

PRIMARY PLUS SECONDARY STRESS INTENSITY

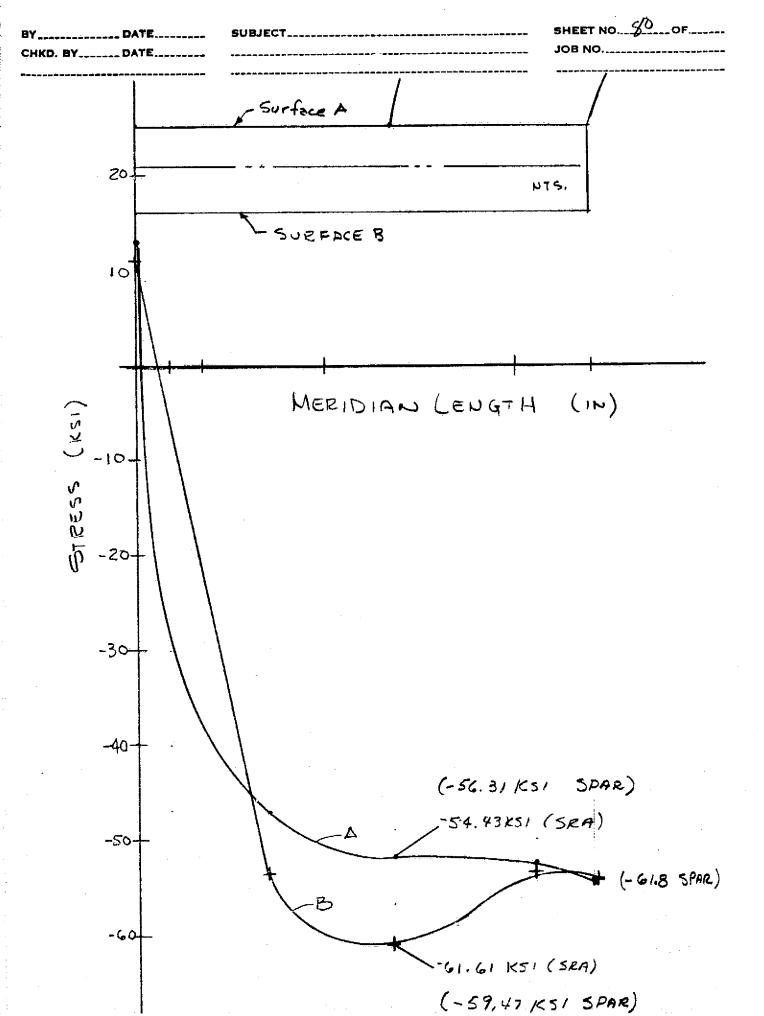
OUTSIDE SURFACE

 $G_{2} = 0$  KS1  $G_{3} = 0$  KS1

5 = 1-54.5 | = 54.5 KSI

Pc+Pn+Q= 54,5 & 60 KS1 OK

THE PRIMARY PLUS SECONDARY STRESS MEET THE STRESS EVALUATION CRITERIA.



BYDATE	SUBJECT	SHEET NO. 81 OF
CHKD, BY DATE		JOB NO

Value Closed Transient temperature Critical load factors:

> Buckling analysis (warm up time 30 min)

Harmonic Number	>	Location	Node
Z	22.80	Bukkhood	14
3	27.36	n	15,16
4			
S	-		
6			
7			-
රි			
<del>(</del> )			
10			
			•

YDATE,	SUBJECT	SHEET NO. OF.
HKD. BY DATE		JOB NO

## Results load Case 3

Gate Value Closed W/ traniTemp dist.

wy 4 Hour warm up line.

BY DATE	SUBJECT	SHEET NO. 7.5 OF
CHKD. BY DATE		JOB NO.

From computer run ESS and

Shown in figures 18, 19, and 20

are stress plots of Choop and Omeridian

Vs. Meridian length.

Fig. 18 18 a numerical average of the inside and outside surface stresses in the circumferential and meridian directions.

Fig. 19 outside sovface stresses in the Circum ferential and meridian directions.

Fig. 20 inside surface stresses in the circum farintial and meridian direction.

BY\_\_\_\_\_\_ SATE.\_\_\_\_\_ SUBJECT\_\_\_\_\_\_\_ SHEET NO. 8 4 OF.\_\_\_\_\_\_ CHKD. BY\_\_\_\_\_ DATE\_\_\_\_\_\_ JOB NO.\_\_\_\_\_\_\_ JOB NO.\_\_\_\_\_

MEMBRANE STRESS (INTENSITY)

PRIMARY LUCAL MEMBRANE STRESS INTENSITY
THERMAL

GENERAL MEMBRANE STRESS

S= 15.59 KSI × 18.2 = 5 OK

THIS REGION MEET THE STRESS

EUALUATION CRITERIA FOR

GENERAL MEMBRANE STRESS.

BY			DATÉ
~	-	nu .	DATE

SUBJECT\_\_\_\_\_

SHEET NO. 05\_\_OF.\_\_\_\_

### INSIDE SURFACE

$$J_{1} = -39.1$$
 KS1  
 $J_{2} = 0$  KS1  
 $J_{3} = -.119$  KS1

$$5_{12} = -39.1 - 0 = -39.1 \text{ K:SI}$$
 $5_{23} = 0 - (-.119) = .119 \text{ K:SI}$ 
 $5_{3/} = -.1/9 - (-39.1) = 38.981 \text{ K:SI}$ 
 $5 = [-39.1] = 39.1 \text{ K:SI}$ 

BYDATE	SUBJECT	SHEET NOOF
CHKD. BYDATE		JOB NO

### OUTSIDE SURFACE

$$S_1 = -39.1 \text{ KSI}$$
 $S_2 = 0.1 \text{ KSI}$ 
 $S_{12} = -39.1 - 0 = -39.1 \text{ KSI}$ 
 $S_{23} = 0 - 0 = 0$ 
 $S_{31} = 0 - (-39.1) = 39.1 \text{ KSI}$ 
 $S_3 = 139.11 = 39.1 \text{ KSI}$ 
 $S_1 = 139.11 = 39.1 \text{ KSI}$ 

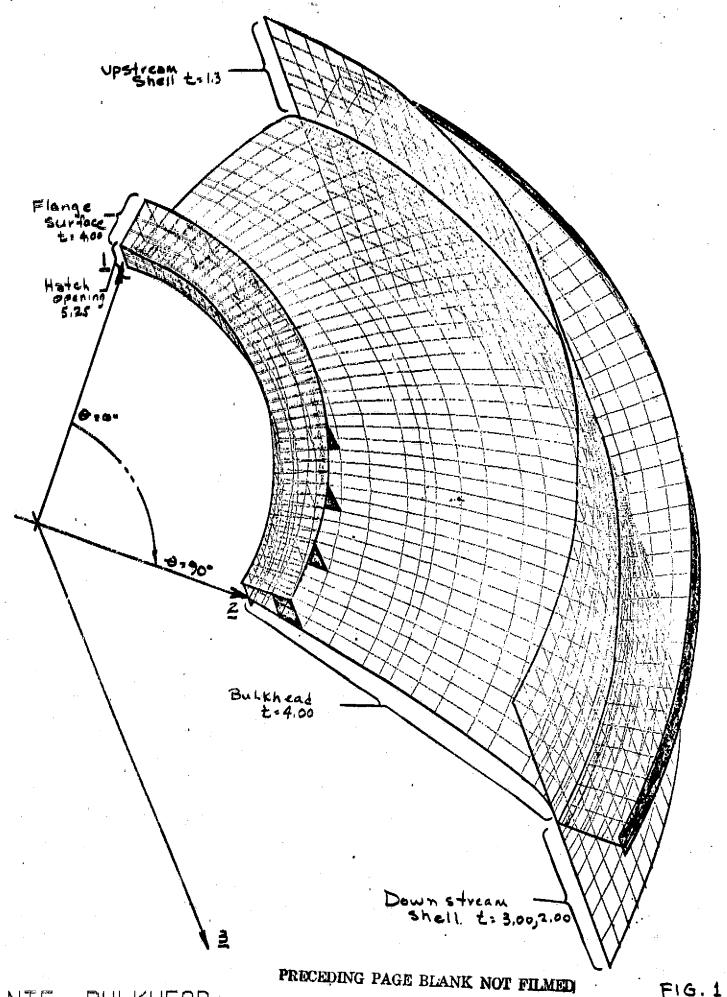
THE PRIMARY PLUS SECONDARY STRESS
INTENSITY MEETS THE STRESS
EVALUATION CRITERIA.

BY DATE	SUBJECT	SHEET NO. 87 OF.
CHKD. BY DATE		JOB NO

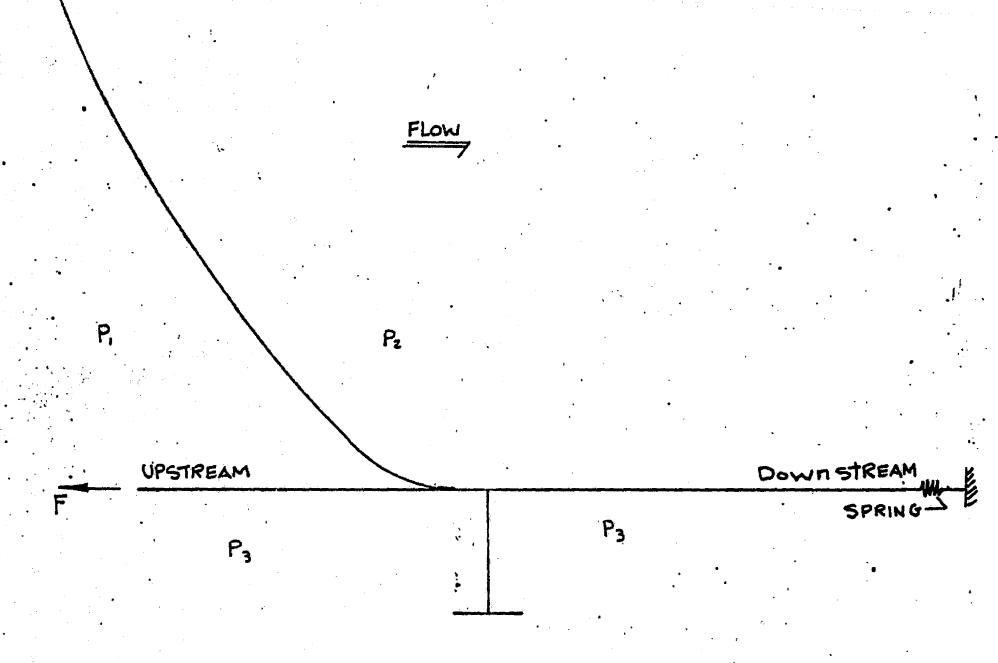
Value closed transient Temp. Critical load factor:

Buckling analysis (warm up time 4 Hours)

Manmaric	>	hocation	Node.
2	23.47	BU LICHEAD	14
3	25.63	) (	14
4	35.26	i (	14
		·	
			•
		: 	\$ *
	•		

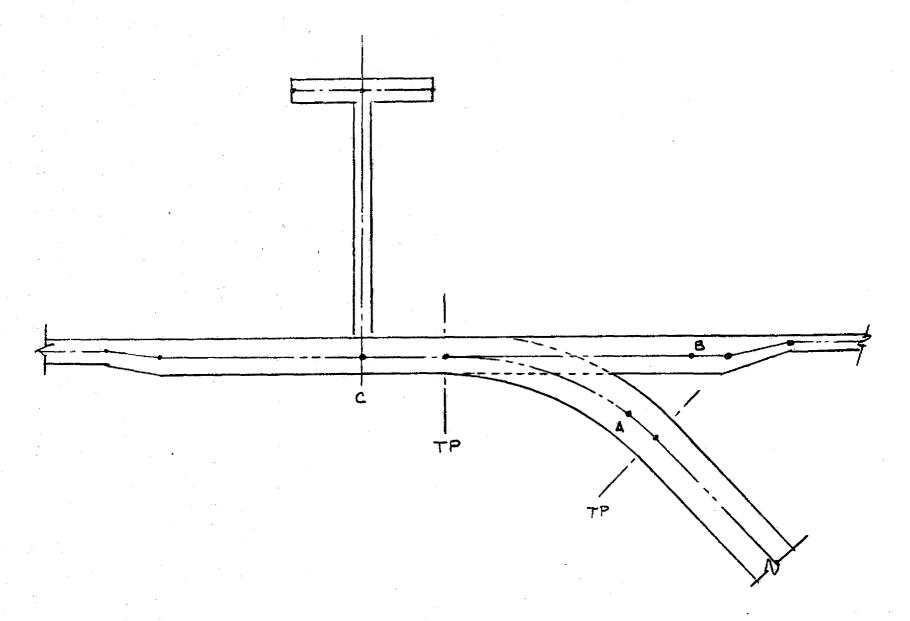


NITE BIII KHEDDI FIG. 1



NTF BULKHEAD CROSS SECTION. VIEW

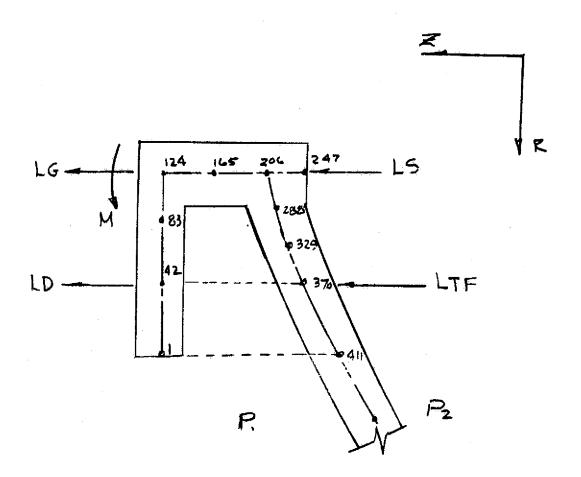
F16. 3



WISHBONE CONFIGURATION

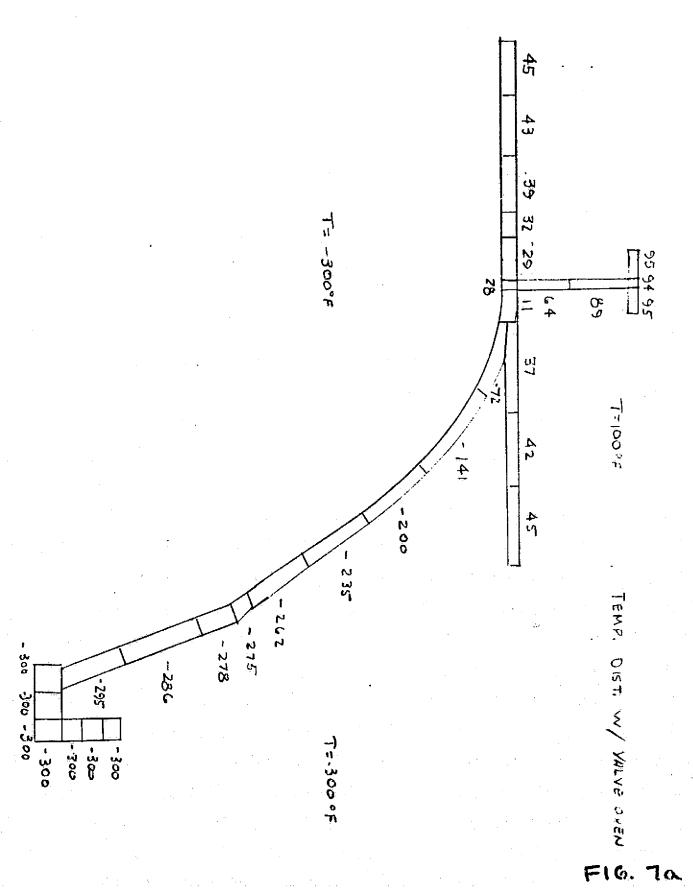
THE WAY IT WAS MODELED ON SPAR & SRA

		JOB NO
CHKD BY DATE		SHEET NOOF
BY DATE	SUBJECT	CHERTAIO



ORIGINAL PAGE IS OF POOR QUALITY

BYDATE	SUBJECT	SHEET NO OF
CHKD. BYDATE	Steady State	TOB NOVE



/ DATE HKD. SY DATE	Translant Temps dist	SHEET NO
	ſ	51
		49
		45
·	22	35
÷	22 30 13	64 <b>89</b> 96 96 95
	-67//	37
	-135	43
	-194	45
	-256	
88 -234	273	
80 206		

		· •
BY DATE	SUBJECT	SHEET NOOF
CHKO. BY DATE		JOB NO
	***************************************	

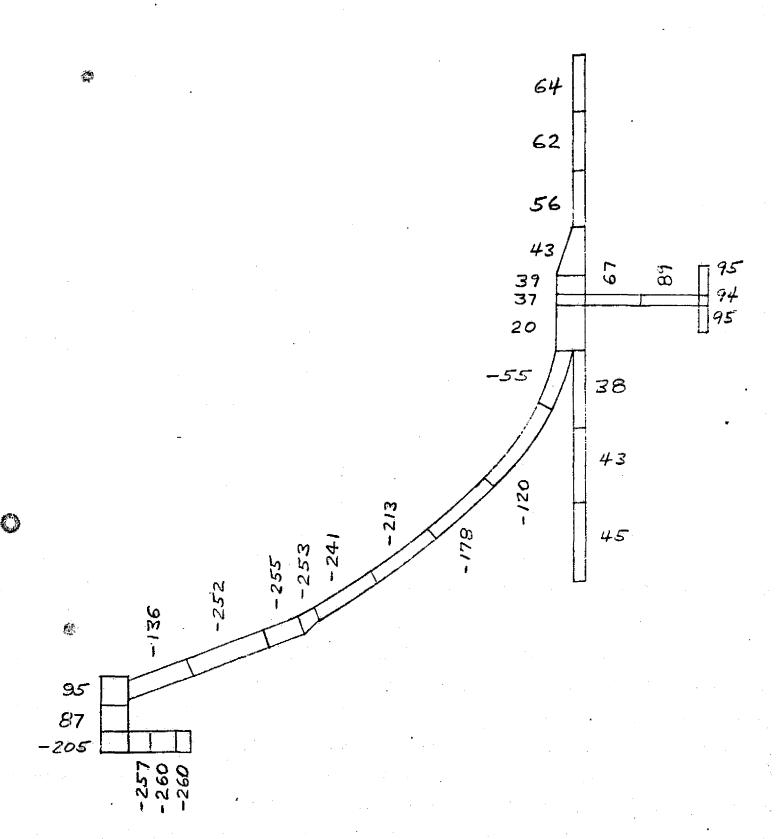
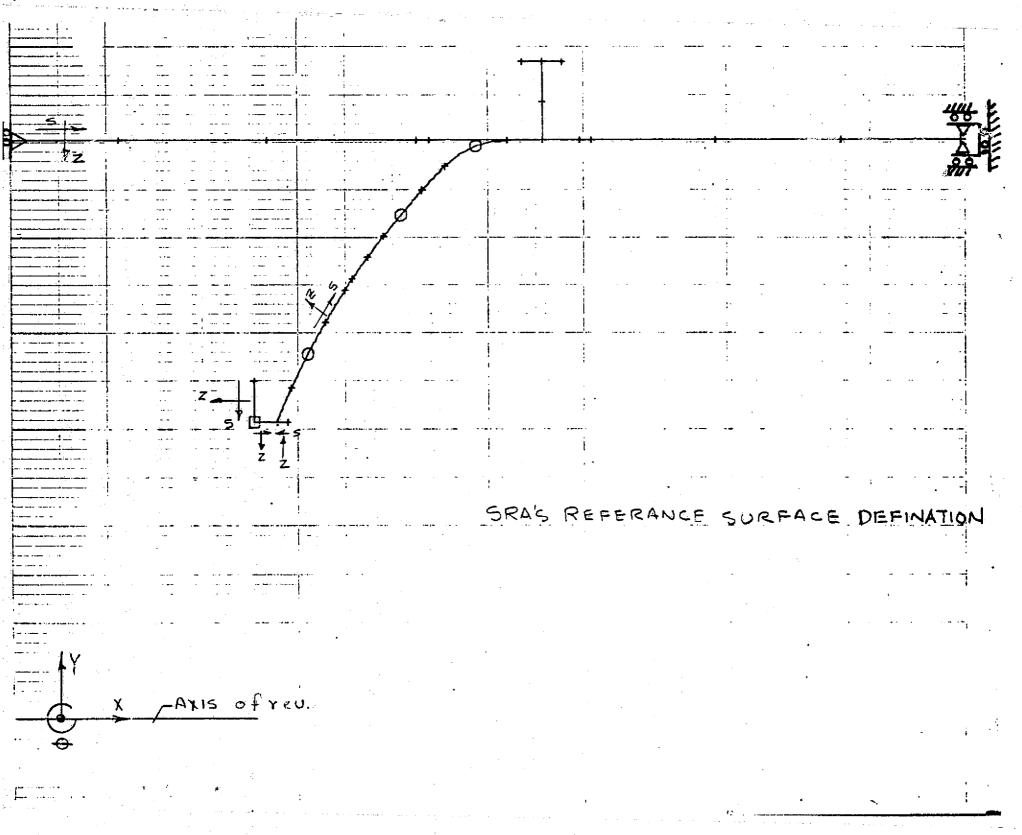


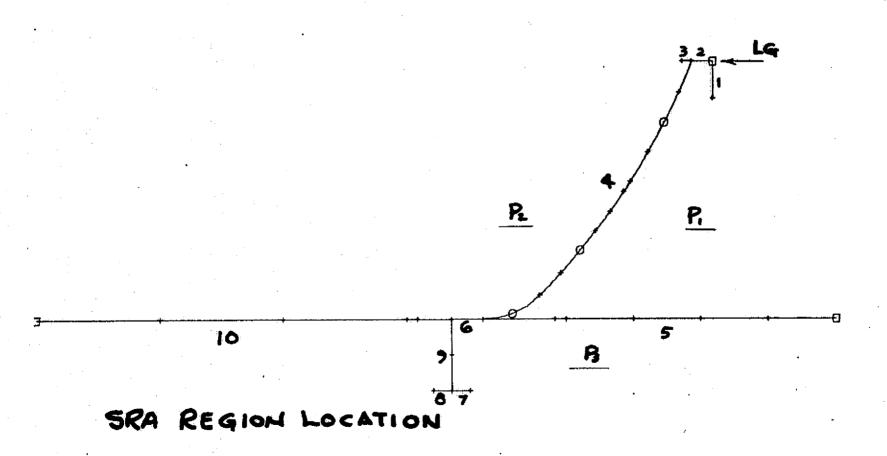
FIGURE - 7C (HEAT UP TIME OF 4 HOURS)

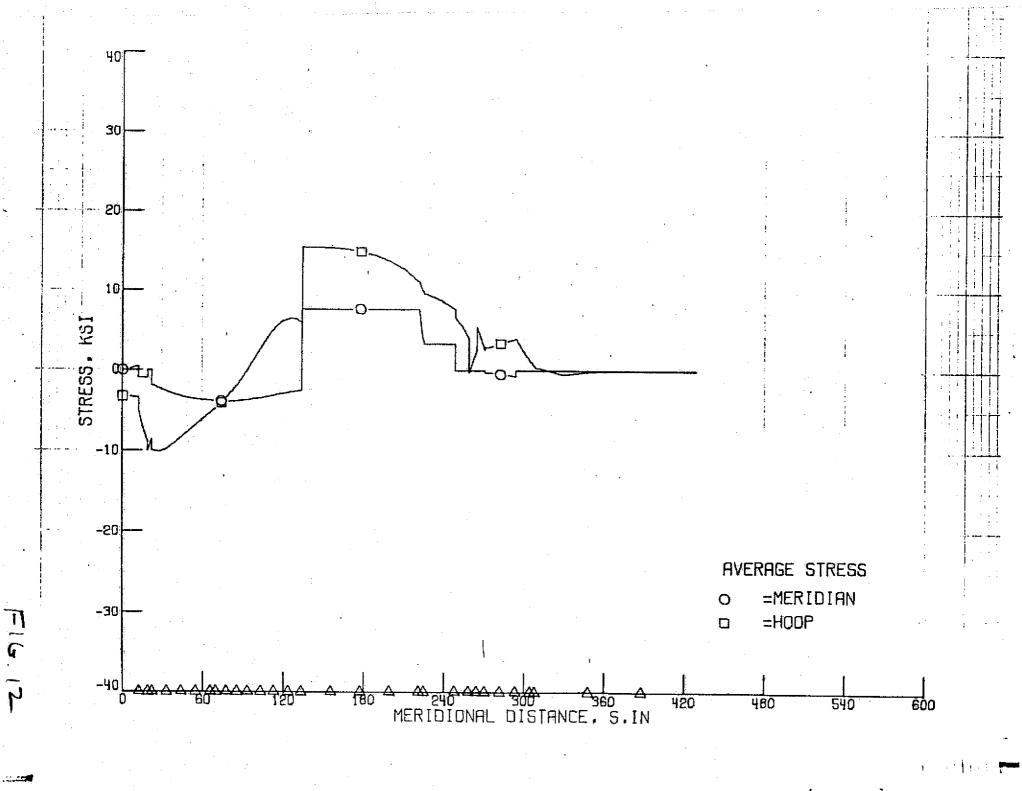


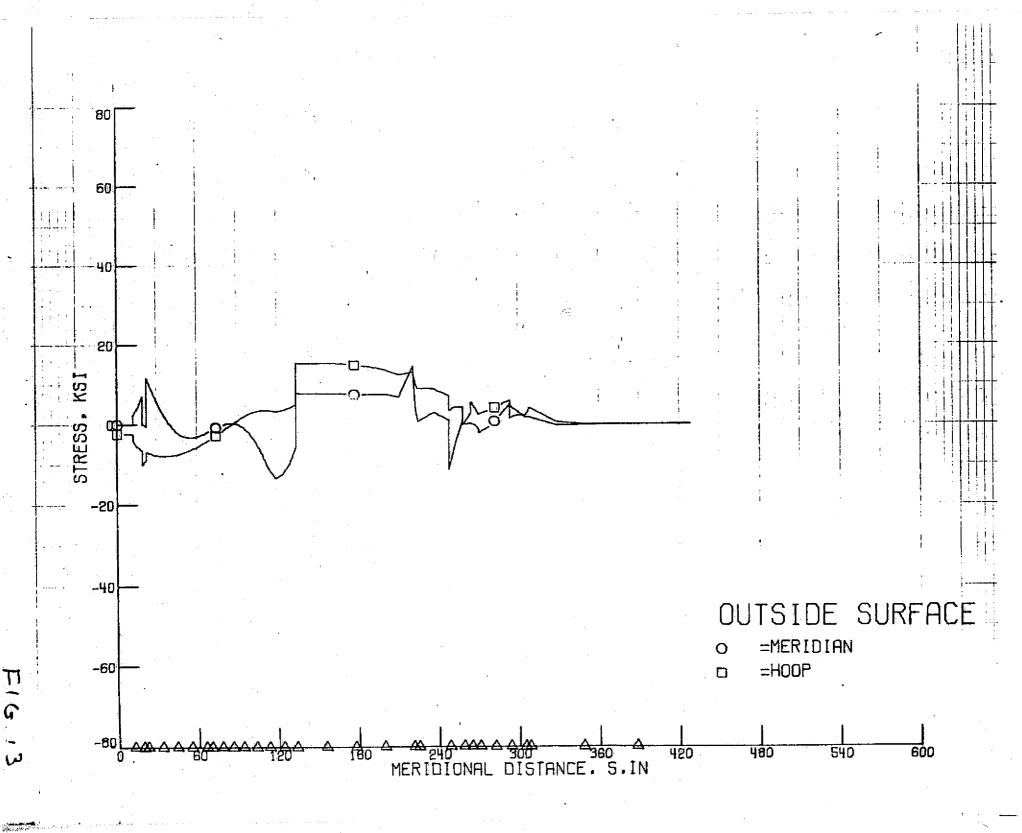
PROFILE PLOT
304 5.5.

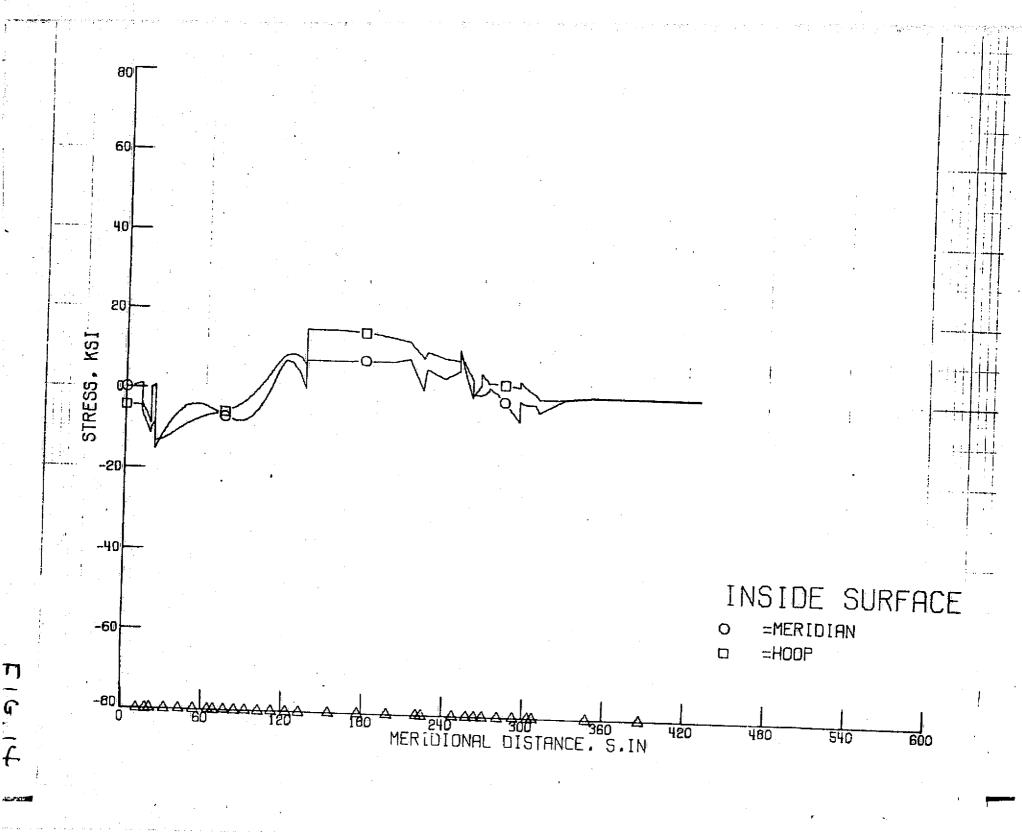
F16.9

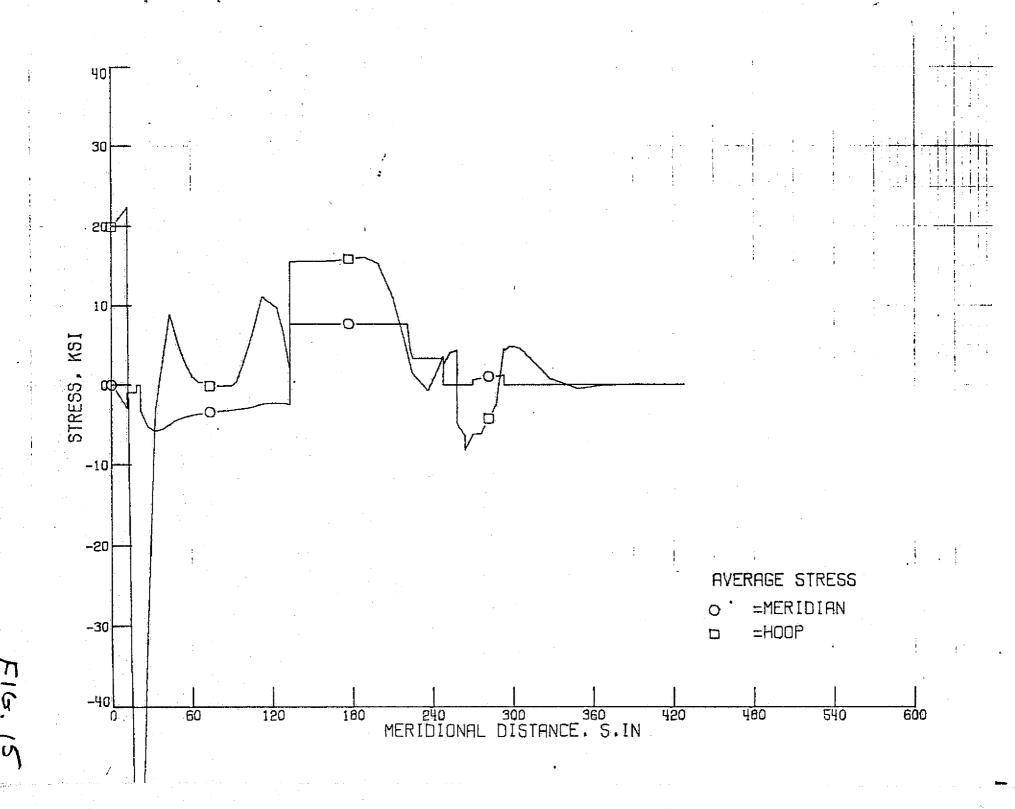
	1 1				· ·	73 72	;		, , , , , , , , , , , , , , , , , , ,	1 1.1 1.1
						G/ 69 70	!			
4	6	48,49	51,52	54,55	57 60 58 61	63 75,7 64 81 45 82	84 85	87,88	90,91	. 93
					39,4	42,43 66 10 78 79				
					Ø 33,34	! !		)		
				5 S. A	₹30,31 -7,28 -75		1 (100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			<u> </u>
				18,19	2					
				015,16		:				
			/	(12,13)	•	•				
			3 4 6		g gar — angangan ga sakatara sakatar sakatar		•			
		1				SPA	JOINT	LOCA	TION	
							9-16-1			
			1 •	•	·				4	
] 4			and the processing of the second							
3	A Property of the Control of the Con	•	- Axi s	of Re	<b>√.</b>		<b>1</b> .			
		<u> </u>						<b>V</b>	•	
)		: :							1 1	

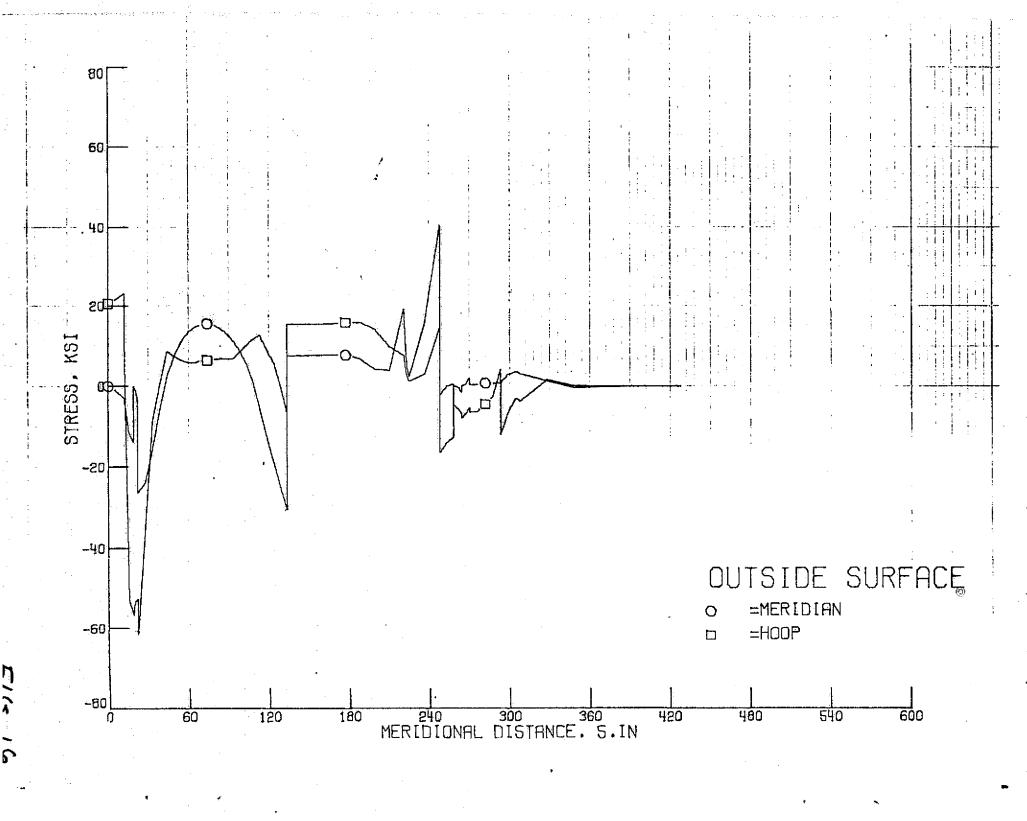


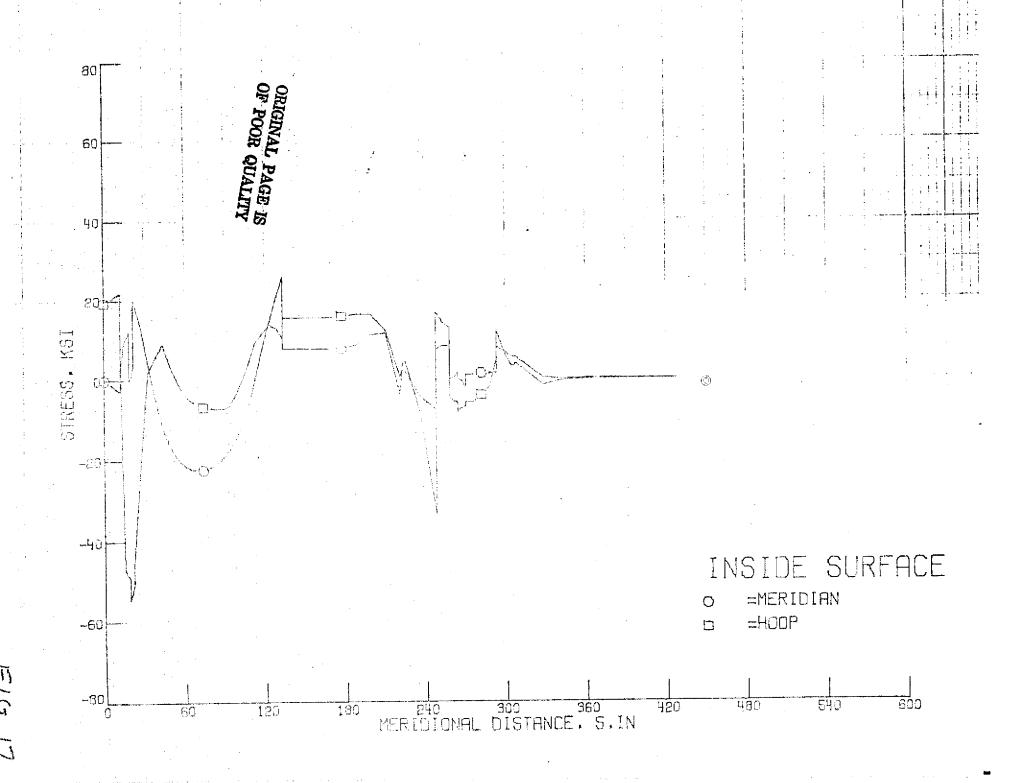


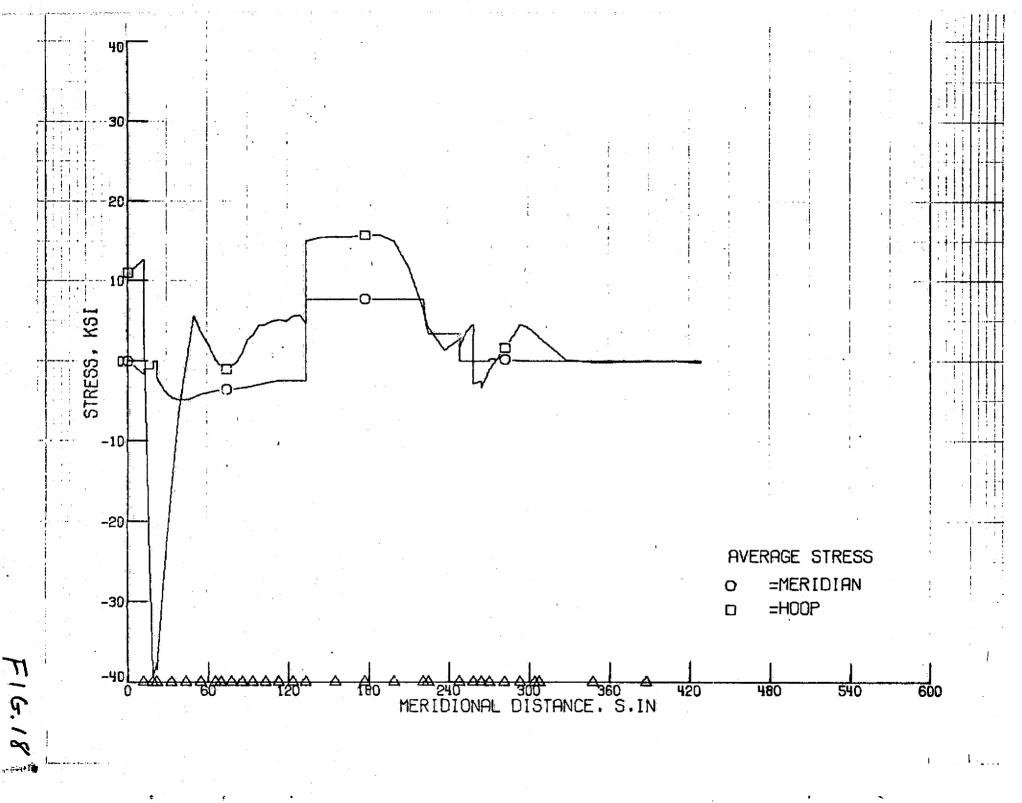


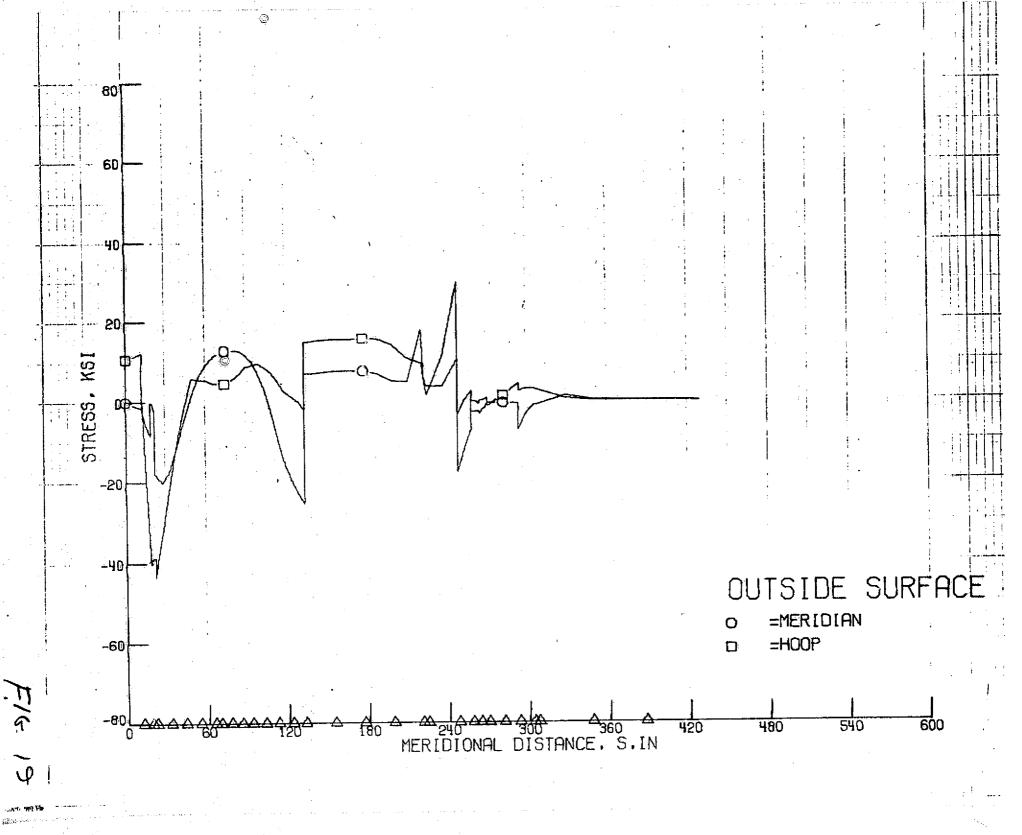


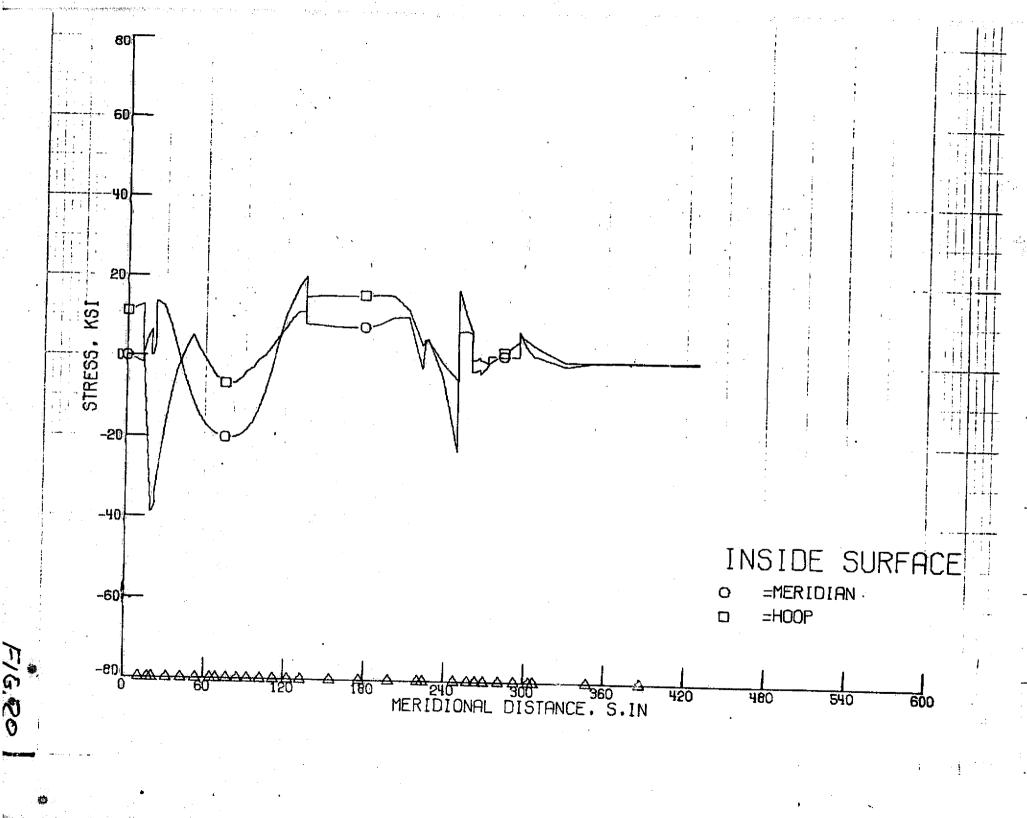






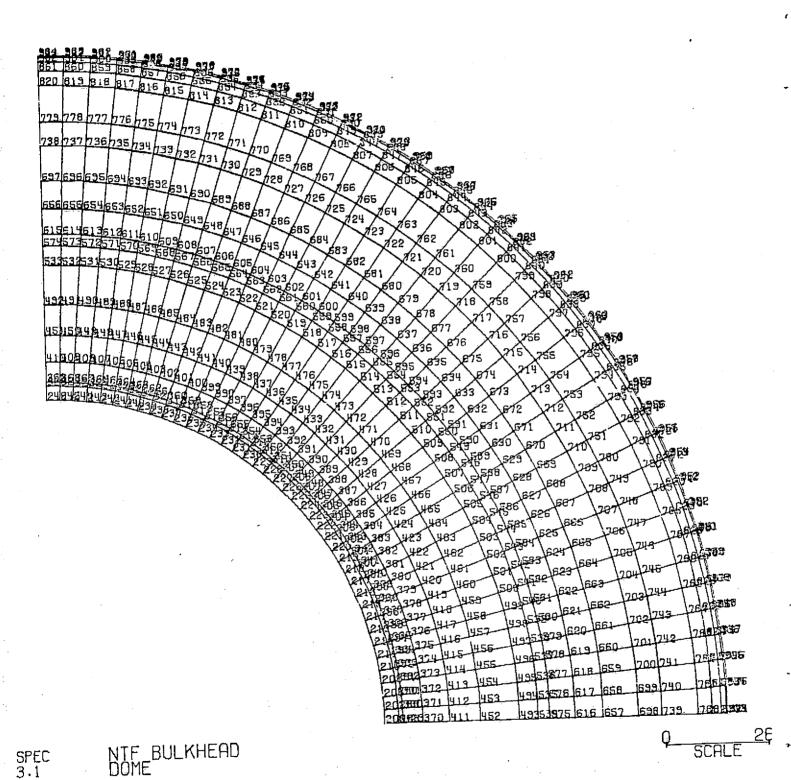






		1805176W275F5W900999885 1026 10671081149 1150 123
1528	1887 1846 1688 1847	18051769726651000293665 1026 10671361149 1130 123   80617697166516529966   1027110631041150   1131   1231
1929	1889 1848	1807179978918918399987 1028 1069 1101151 1192 123
1931	1890 1845	18081787729153983539888 10291073111152 1193 123
1932	1831 1650	1809170977075115523085 1030 10711131153 1194 123
1933	892 (851	1810178929105935591090 1031 1072 1131154 1195 123
1939	1893 1852	181177072915555559191 1032 10731141155 1196 123
1935	1894 1853	181917979971135251992 103310741151156 1197 123
1936	1895 1854	1813171001600118100003 1034 10751151157 1198 123
1937	.896 1856	181417037531615753331894 1035 10751171158 1199 124
1938	1897 1856	1818177471570557155795 103610771181159 1200 124
1939	1898 1857	1818170570055015550556 1037 1070 1151160 1201 124
1940	1899 1868	1817177675157553576837 1038 10731201161 1202 124
		181817177261875913283698 1039 1089 1211162 1203 124
1941	1900 1869	
1992	1901 1860	
1943	1861	182017 9 38 8555 5 35 000 104 1 108 212 31164 1205 124
1944	1903 1862	182 17 00 50 25 25 25 25 201 1042 105 1241 155 1206 124
1945	1904 1863	182217807019553523510021043110511251156 1207 124
1946	1905 1864	18231757 17035217287 2031044 1065 1261167 1205 124
1947	1906 1865	18241733792050533787004104510831271168 1209 125
1948	1907 1866	1827178171676767878981005104610671281169 1210 125
		1826178741101578793110061047 10511251170 1211 125
1949	1928 1867	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
1950	1909 1868	
1951	1910 1869	18281717176011178 00810491097131172 1213 125
1952	1911   1870	15241750 1710 1214 125
1953	1912 1871	183017094803055590101061 1003 1331174 1215 125
1954	1913 1872	183 1790 19 05675 35 011 1052 1053 1341175 1216 125
1955	1914 1873	183017275767535223012105310911301176 1217 128
1956	1915 1874	18391787501865557848131054 10551381177 1218 125
1957	1916 .875	183417835718055 33014105510531371178 1219 128
1958	1917 1876	18351 794753152 - 37 015 1056 10971341179 1220 126
1959	1918 1877	183817095016755599016105710991331180 1221 126
1960	1919 1878	
	920 1079	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1961		1839178095716055322501910601101193183 1224 126
1962	1922 1681	
1964	1923 1882	184 1850 2010 2010 2010 2010 2011 2014 185 1226 126
1965	1924 .883	
1366	1925 1884	184318022015-05:3000023106411011461167 1228 124
1967	1926 1885	;   18441619762145152940241065  1C31411188   1229   12
1968	1927 1886	

SPEC 5.1 NTF BULKHEAD SHELL 9 36 SCALE

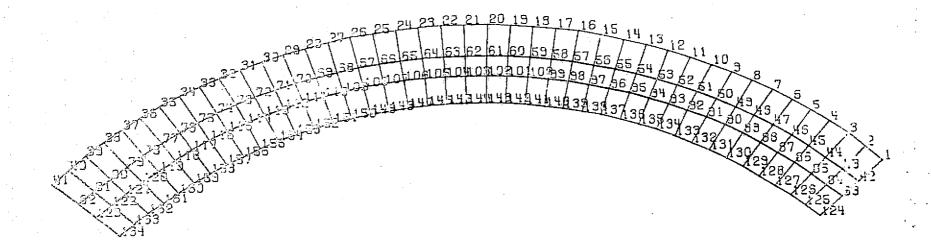


F16.22

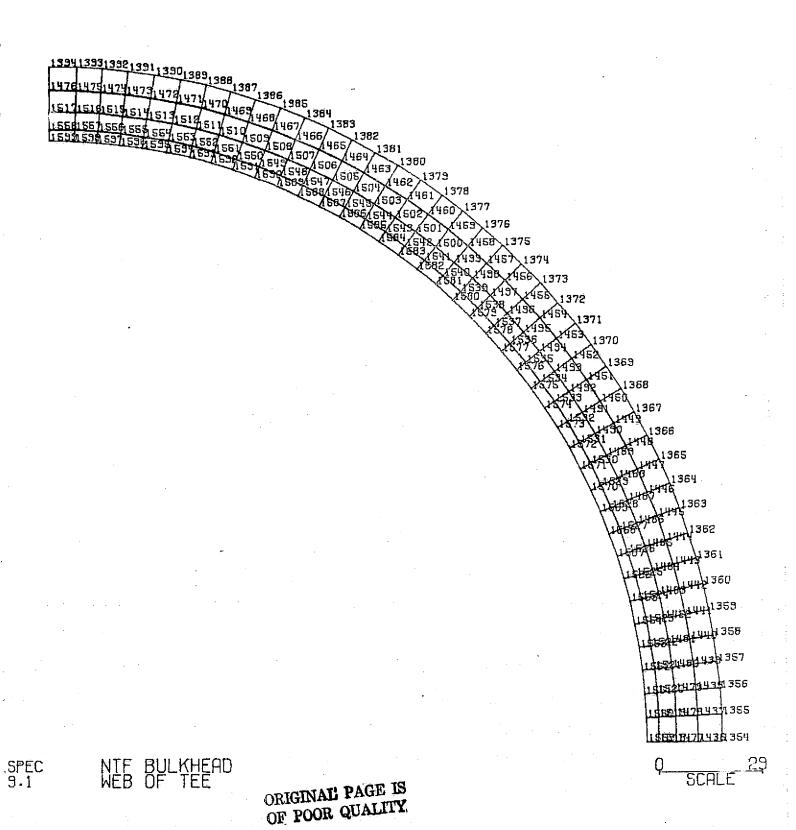
ORIGINAL PAGE IS OF POOR QUALITY

NTF BULKHEAD HATCH OPENING

Q\_\_\_\_SCALE



SPEC 2.1 NTF BULKHEAD FLANGE SURFACE O SCALE



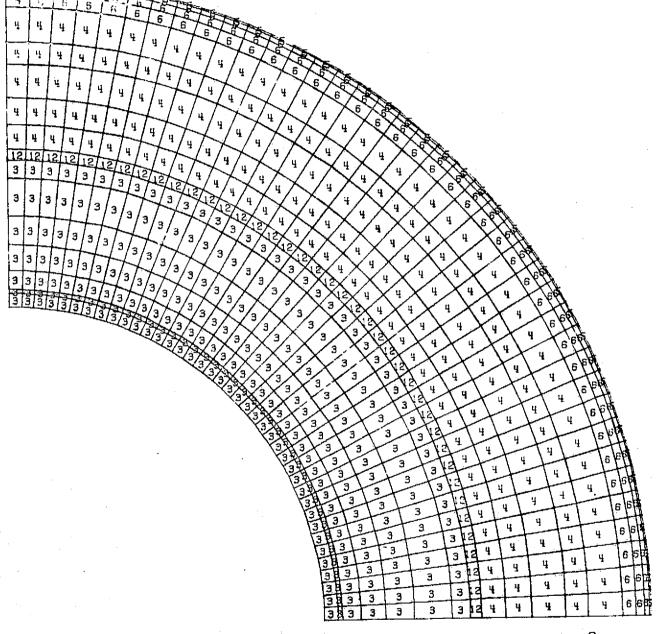
F16 25

9	9	9	9	3	9	197	īd	6616	16	17	8	9	8	8
9	9	9	9	9	9	विन	_	6616	•	17	8	8	8	8
9	9	9	9	9	9	157		6316		17	8	В	8	8
9	9	9	9	9	9	157	1	6616	16	1.7	В	8	8	8
9	9	9	9	9	9	167	Id	6516	16	17	8	. 8	8	8
3	9	9	9	9	9	157	Ц	\$611	16	17	8	8	8	8
3	9	9	9	3	9		Ц	3511	*	17	8	8	8	8
3	9	9	9	9	9	157		8616	16	17	8	В	- 18	8
3	3	5	9	3	9	157				17	0	13	8	
9	9	9	9	9	9	157	19	661	16	17	9	B	9	8
9	9	9	9	9	9	167	19	451	16	17	8	8	. 8	8
3	9	9	9	3	93	157	ļ	3 \$1	16	17	8	8	8	8
3	3	5	7	3	3	197	ļ	13 \$11	18	17	8	8	8	8
3	9	3	3	9	5	157	Id	G\$1	18	17	8	8	ŧ	8
2	9	9	9	9	9	157	I	251	18	17	8	8	8	8
9	9	9	9	9	9	157	7"	861		17	8	В	8	8
9	9	9	9	9	9	157	ſ	531	16	17	8	8	В	8
9	9	9	9	9	9	157	Īέ	951	16	17	8	В	8	8
3	9	9	9	9	9	157	le	531	18	17	8	6	9	8
3	9	9	9	3	9	157	ŀ	351	18	17	B	9	8	9
9	9	9	9	9	9	197	E	8.51	1.5	17	8	8	8	8
3	9	3	9	9	9	1.57	15	3.51	15	17	В	8	9	8
3	3	9	9	9	3	157	Į	\$\$1	1,6	17	8	8	8	8
3	9	9	3	9	9	157	٤	551	3 16	17	В	8	8	8
3	9	9	9	9	3	157	Įε	g și	16	17	8	Ð	8	8
3	9	9	9	9	9	15	Ĺ	¢ģi	16	17	8	В	8	8
3	9	3	9	9	9	157	10	. 5 <b>\$</b> 1	5 18	17	8	B	8	8
3	3	9	9	9	9	167	Ī	ជំនុំរ	3 16	17	8	8	5	5
9	9	9	9	9	9	157	Īŧ	4-		17	8	8	8	8
9	9	9	9	9	9	157		6.≑1		17	8	8	8	8
3	9	9	9	9	9	1.67	Į	4 4 1	6 16	17	в	9	8	8
3	3	3	3	9	3	157	10	9 4	0 16	17	8	8	8	8
9	9	9	9	9	9	157	16	3 3 1	6 16	17	8	8	8	8
9	9	9	9	9	9	:57				17	8	8	В	8
3	9	9	9	9	9	157	1	3 \$ :	<del>-&gt;</del>	17	18	3	8	8
3	3	9	3	3	3	157	-	<del>( -                                   </del>	<del>-</del>	17	10	8	8	8
9	3_	9	9	9	9			115.		17	<u> </u>	8	8	8
9	9	9	9	9	9	157		1161		17	8	8	8 B	8
9	9	9	9	1 2	9		_	1361		17	8	1 8	8	10
[ 3	1 3	1 3	1 2	13	10	<u> </u>		₹ <del>2</del> 3 3 7	-1-10	1 11	J	<u> </u>	۔۔ ۲۔۔۔	<del></del>

SPEC 5.1

NTF BULKHEAD SHELL

Q SCALE



SPEC 3.1 NTF BULKHEAD DOME

> ORIGINAL PAGE IS OF POOR QUALITY

ELEMENT SOUTTON PROPERTY

SCALE

>

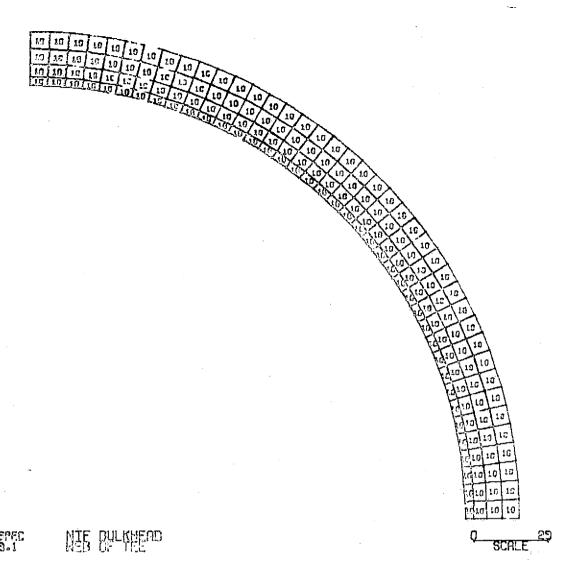
SPEC 2.1 NTF BULKHEAD FLANGE SURFACE O 21 SCALE

Ę	E		6	2	e	1	2	Ŕ	2	s	3	s	Ę		1	2	2	2	2	2	2	2	2	5	2	2	2	5	2	2	5	2	2	2	2	2	2	2	2	2	2	2
E	z		2	2	2	1	•	2	2	12	2	2	٤	2 2	:[:	g	2	E	٤	٤	£	2	e	ε	2	٤	2	٤	2	2	g	E	٤	g	8	e	٤	2	2	2	٤	e
ß	2	1	2	8	2	ĺ	Ŀľ	2	2	2	2	2	2	: :		2	2	2	2	2	£	z	2	ε	2	2	2	Ē	٤	2	2	٤	2	2	2	2	٤	2	٤	2	2	2

SPEC. 10-1

NTE BULKHEAD HATCH OPENING Q 18

ORIGINAL PAGE IS OF POOR QUALITY

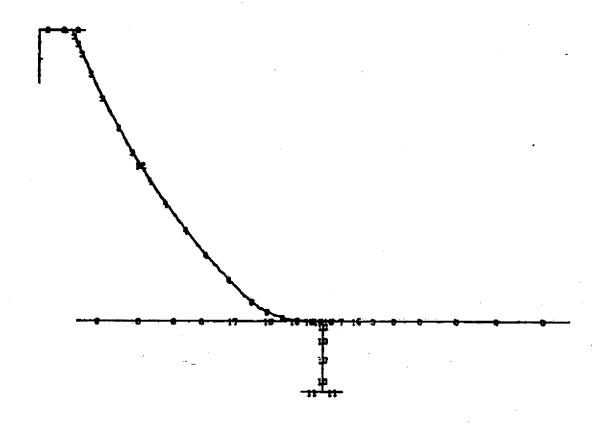


C 30

SPEC NIE BULKHEAD

C 4

ORIGINAL PAGE IS OF POOR QUALITY



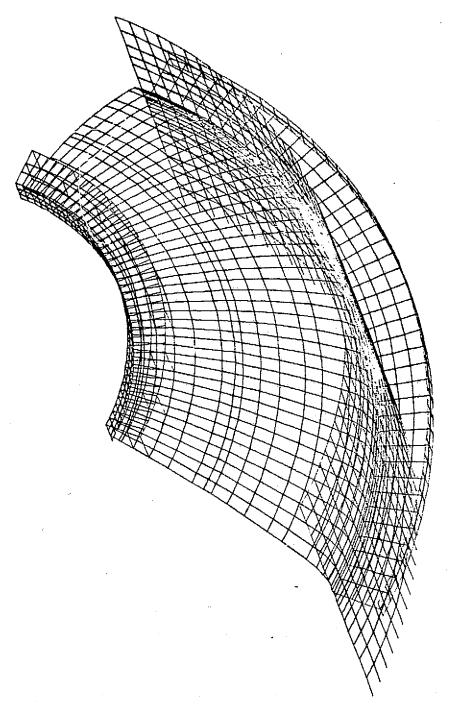
NTE BULKHEAD CROSS-SECTION VIEW

## CASE 1

GATE UALUE CLOSED STRESS PLOTS

FIGURES 33 THRU 59

COMPUTER RUN NO. LAK



O 41 SCALE

SPEC NIE BULKHEAD

DISPLAY= SX

/1000 , NODE= 1 , SURFACE=

							_ 1	<u>.</u>	•		001	<b>VI II</b>				
0	0	0	0	1	1	2	[3		5		7	3	12	14	15	16
0	0	0	0	1	1.1	2	_	-		5 6	7	9	12	14	15	16
0	0	0	0	1	1	12		+	++	5 6	1-7-	9	12	14	15	16
0	0	0	0	$\frac{1}{1}$	1	2	-			5 6	7	9-	12	14	15	16
0	0	0	0	H	1	2	13	4	믡	5 6 5 6	1	9	12	14	15	16
<del>   </del>	0	0	0	1	1	2	3	_	5	<del></del> -	7	9	12	14	15	16
0	0	0	0	1	ti	2	3	+	5	-	7	9	12	14	15	1.6
	0	C	0	i	ti	2	3	• -	5	<del>-</del>	7	9	12	14	15	16
0	a	0	0	1	í	z	⊷	•	5	+	7	9	12	14	15	-
0	0	0	0	1	i	2	•	•	5	+	7	9	12	14	15	16
0	0			⊢	-	2	╆┈	┰	++	+	-		-		<del></del>	-
		0	0	1	1	+-	+	+-	5	+	7	9	12	14	15	16
	0	0	0	1	L	2	Ē	H	5	┿	7	9	12	14	15	16
0	0	0	0	1	1	2	3	٠.	5	+	7	9	12	14	15_	16
8	0	0	0	1	1	2	3	4	5	6	7	9	12	14	15	15
0	0	. 0	0	1	i	2	3	4	5	6	7	9	12	14	15	15
0	0	0	a	1	1	2	3	4	5	6	7	9	12	14	15	16
0	0	. 0	0	1	ı	2	3	4	5	8	7	9	12	14	15	16
O	0	0	۵	1	1	2	3	ų	55	8	7	9	12	14	15	15
0	0	0	O	1	1	2	3	4	5	5	7	9	12	14	15	16
0	0	0	O	1	1	2	3	4	5.	6	7.	9	12	14	15	16
0	0	0	0	1	1	2	3	4	5	6	7	9	12	14	15	16
0	0	0	0	1	1	2	3	4	5	6	7	9	12	14	15	16
0	0	Û	0	1	1	2	Э	ч	5 5	6	7	9	12	14	15	16
0	0	٥	0	1	1	2	3	ų	55	6	7	9	12	14	15	16
Ð	ū	0	0	1	1	2	3	4	55	6	7	9	12	14	15	16
٥	0 .	Ò	٥	1	1	2	3	14	55	6	7	9	12	14	15	18
0	0	0	Ó	1	1	2	3	ų	55	6	7	9	12	14	15	16
0	0	0	0	1	Į	2	3	ų.	55	6	7	9	12	14	15	16
۵	0	C	0	1	ı	2	3	4	55	6	7	3	32	14	15	16
0	G	0	0	1	l	2	3	4	5 5	6	7	9	12	14	15	15
0	0	0	0	1	1	2	3	ų	55	6	7	9	12	14	15	16
0	0	0	0	1	1	2	3	4	55	6	7	- 9	12	14	15	16
0	0	O	0	1	1	2	3	ų	55	8	7	9	12	14	15	16
0	0	0	0	1	1	2	3	_	55		7	9	12	14	15	16
0	0	0	0	1	ţ	2	3		55	6	7	9	12	14	15	16
0	0	0	0	1	1	2	3		5 5		7	9	12	14	15	16
0	0	0	0	1	1	2	3	$\overline{}$	5 5	6	7	9	12	14	15	16
0	0	0	0	1	l	2	_	ų	-	6	7	9	12 12	14	15	16
	<u> </u>	U	<u>u. j</u>		L.	드	J.	3.	<u>JO</u>	O.	/	3	12	14	15	16

SPEC 1 NTF BULKHEAD SHELL

0<u>36</u>

F16 34

DISPLAY= SX

/1000 . NODE=

1. SURFACE=

/	IUU	IU ,	N	UUI	_=	:		J	Ļ	۴			ԾՄԻ	(FHI	JE:	_	· 1	
	0	O	0	C	1	2	3	3	4	ļ,	3	6	7	. 9	12	14	16	JB.
L	0	0	0	O	1	2	3	3	٠.	4	3	6	7_	9	12	14	16	iŝ
ŀ	<u> </u>	0	0	0	1	2	3	3	1	4	н	6	7	9	12	14	16	16
ŀ	0	0	0	0	1	2	3	3	-	1	$\overline{}$	6	7	9	12	14	16	16
ŀ	0	0	0	0	1	5	3	3	14	+	3	6	7	9	12	14	16	16
┝	0	0	0	à	1	2	3	3	<u>1</u>   <u>1</u>	4	Ī	6	7	9	12	14	16	16
ŀ	0	0	ā	0	1	2	3	3	┰	+-	Н	6	7	9	12	14	16	16
۲	<del>-</del>	0	0	0	†	2	3	3	-	4	Н	6	7	9	12	14	16	15
t	0	0	0	0	1	2	3	3	4	Н	Н	6	7	9	12	14	16	16
r	0	0	0	0	1	2	3	3	-	ŀ		6	7	9	12	14	16	16
r	0	0	0	0	1	2	3	3	١-	ų	н	6	7	3	12	14	16	16
ļ	0	0	0	0	1	2	3	3	4	H	3	8	7	9	12	14	16	16
r	0	0	0	0	1	2	3	3	4	4	3	6	7	9	12	14	16	16
	٥	Û	0	0	1	2	Э	3	4	4	3	6	7	9	12	14	16	15
	٥	0	O	0	ı	2	3	Э	4	ij	3	8	7	ģ	12	14	16	16
Γ	0	0	0	a	1	2	3	3	4	H	3	6	7	9	12	14	16	16
	ם	0	۵	0	1	2	3	3	ч	Н	3	6	7	9	12	14	16	16
	0	0	۵	a	1	2	3	3	4	4	3	6	7	9	12	14	16	16
	0	0	0	0	1	2	3	3	ų	1	3	6	7	9	12	14	16	16
	0	٥	0	0	1	2	3	3	ų	į	3	6	7	9	12	14	16	16
	0	0	a	Q	1	2	з	3	4	H	3	6	7	9	12	14	16	1.5
L	0	0	0	0	1	5	3	9	4	ų	3	6	7	9	12	14	18	16
	0	0	c	O	1	2	3	3	4	4	3	6	7	9	12	14	16	<b>1</b> 6
	0	0	0	0	1	2	3	3	4	1	3	6	7	9	12	14	15	16
	0	0	0	0	1	2	3	3	ų	7	3	6	7	9	12	14	16	16
	0 -	0	0	Q	1	2	3	3	4	Ŧ	3	6	7	9	12	14	16	16
L	0	0	0	0	1	5	3	3	4	إيا	3	6	7	9	12	14	16	16
Ĺ	0	0	ប	0	1	2	3	3	4		-	6	7	9	12	14	16	16
L	0	۵	0	a	1	5	3	3	4	4	Эļ	6	7	9	12	14	16	16
_	0	0	0	0	1	2	3		ч	_	_	6	7	9	12	14	16	16
_	0	0	0	0	1	2	3	Į	4	-	-	6	7	9	12	14	1.6	16
	0	0	0	0	1		3	_	4	-	-	6	7	9	12	14	16	1,5
_	0	0	0	0	1	2	3	3	ų			Б	7	9	12	14	15	16
_	0	0	0	0	1	2	3	3		4	-	5	7	9	12	14	15	16
_	0	0	0	0	1	2	3	_	4	4	3	6	-7	9	12	14	16	16
-	0	0	0	0	1	2	3	3	_	4	3	5	7	9	12	14	16	16
_	0	0	0	0	1	2	3	_	4	4 u	-	6	7	9	12	14	15 16	<u>16</u>
_	- <del>5</del> -(	0	0	0	1	2	3		4			6	7	9	12	14	16	16

SPEC i

NTF BULKHEAD SHELL

Q 36 SCALE

ORIGINAL PAGE IS OF POOR QUALITY DISPLAY= SX

/1000 . NODE=

SURFACE=

2

O								_									
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         0         1         2         3         4         67         7         10         12         13         15         16				-					4		-	_		<del></del>		+	
O				-	+	+	,	-	•	•				+			
0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         16         7         10         12         13         15         16           0         0         0         0         0         1         2         3         16         7         10         12         13         15         16           0         0         0         0         0         1         2         3         16         7         10         12         13         15         16           0         0         0         0         0         1         2         3         16         7         10         12         13         15         16           0         0         0         0         0         0         1         2         3         16         7         10         12         13         15         16           0         0         0         0         0         1         2				<del></del>	+-	-	-	•	+	-	-		<del></del>		<del></del>		
O	·	-	<del></del>		-	<del>-</del>			-		_		-	<del></del>	-		
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15	0	0	0	0	0	1	-	$\overline{}$					<del>                                      </del>				
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>0</td><td>0</td><td>0</td><td>0</td><td>a</td><td>1</td><td>2</td><td>3</td><td>•</td><td>-</td><td>+</td><td>7</td><td>10</td><td>12</td><td></td><td>15</td><td></td></t<>	0	0	0	0	a	1	2	3	•	-	+	7	10	12		15	
0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         7         10         12	0	0	Q	0	0	ī	2	3	4	6	7 5	7	10	12	13	15	16
0	C	0	0	G	0	1	2	3	ų	6	7 6	7	10	12	13	15	16
O         C         O         O         O         I         2         3         4         6         7         10         12         13         15         16           O         O         O         O         O         I         2         3         4         6         7         10         12         13         15         16           O         O         O         O         O         I         2         3         4         6         7         10         12         13         15         16           O         O         O         O         O         I         2         3         4         6         7         10         12         13         15         16           O         O         O         O         I         2         3         4         6         7         10         12         13         15         16           O         O         O         O         I         2         3         4         6         7         10         12         13         15         16           O         O         O         O         I <t< td=""><td>0</td><td>O</td><td>0</td><td>0</td><td>ű</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7 6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	O	0	0	ű	1	2	3	4	6	7 6	7	10	12	13	15	16
0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16 0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16 0 0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16	٥	ſ,	0	0	٥	1	5	3	4	6	7 6	7	10	12	13	15	18
0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0	0	£,	0	0	٥	ī	2	3	4	6	6	7	10	12	13	15	16
0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0 <t< td=""><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>s</td><td>7 6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	0	0	0	0	1	2	3	4	s	7 6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15	0	0	0	0	0	1	2	Э	ų	6	7 6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>O</td><td>٥</td><td>0</td><td>0</td><td>٥</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	O	٥	0	0	٥	1	2	3	4	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2 <t< td=""><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>ı</td><td>2</td><td>з</td><td>ч</td><td>5</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	0	0	0	0	ı	2	з	ч	5	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16	D	0	0	0	0	1	2	3	4	6	7 6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16	0	0	0	0	٥	1	2	3	4	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0 <t< td=""><td>0</td><td>0</td><td>0</td><td>a</td><td>0</td><td>ı</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7 6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	0	0	a	0	ı	2	3	4	6	7 6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0	0	ū	G	0	0	1	2	3	u	Б.	7 6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>0</td><td>0</td><td>0</td><td>0</td><td>o</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	0	0	0	o	1	2	3	4	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         0         12         13         15         16           0         0         0         0 <td< td=""><td>0</td><td>0</td><td>0</td><td>۵</td><td>0</td><td>1</td><td>2</td><td>Э</td><td>4</td><td>6</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></td<>	0	0	0	۵	0	1	2	Э	4	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>. 0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>ı</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7 6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	. 0	0	0	0	0	ı	2	3	4	6	7 6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         67         6         7         10         12         13         15         16	0	0	0	0	O	1	2	з	4	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>0</td><td>٥</td><td>O</td><td>0</td><td>0</td><td>1</td><td>2</td><td>3</td><td>ч</td><td>6</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	٥	O	0	0	1	2	3	ч	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>0</td><td>0</td><td>Đ</td><td>0</td><td>0</td><td>ı</td><td>2</td><td>3</td><td>4</td><td>6</td><td>7 6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	0	Đ	0	0	ı	2	3	4	6	7 6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>C</td><td>0</td><td>۵</td><td>0</td><td>۵</td><td>1</td><td>2</td><td>Э</td><td>ч</td><td>6</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>15</td></t<>	C	0	۵	0	۵	1	2	Э	ч	6	6	7	10	12	13	15	15
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0 <t< td=""><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>ı</td><td>2</td><td>3</td><td>ų</td><td>6</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	0	0	0	0	ı	2	3	ų	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>0</td><td>0 -</td><td>0</td><td>0</td><td>0</td><td>1</td><td>2</td><td>Э</td><td>Ч</td><td>6</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	0 -	0	0	0	1	2	Э	Ч	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>0</td><td>Û</td><td>0</td><td>0</td><td>0</td><td>1</td><td>5</td><td>3</td><td>4</td><td>6</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	Û	0	0	0	1	5	3	4	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2         3 <t< td=""><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>6</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	0	0	0	0	1	2	3	4	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         7         10         12         13         15         16           0         0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0 <t< td=""><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>67</td><td>6</td><td>7</td><td>10</td><td>12</td><td>13</td><td>15</td><td>16</td></t<>	0	0	0	0	0	1	2	3	4	67	6	7	10	12	13	15	16
0     0     0     0     0     1     2     3     4     6     7     10     12     13     15     16       0     0     0     0     0     1     2     3     4     6     7     10     12     13     15     16       0     0     0     0     0     1     2     3     4     6     7     10     12     13     15     16       0     0     0     0     0     1     2     3     4     6     7     6     7     10     12     13     15     16       0     0     0     0     0     1     2     3     4     6     7     6     7     10     12     13     15     16       0     0     0     0     0     1     2     3     4     6     7     10     12     13     15     16	0	0	0	0	0	1	2	_		٠,	_	7	10	12	13	15	16
0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16 0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16 0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16 0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16 0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16	0	0	0	0	0	1	2	3	4	6	6	7	10	12	13	15	16
0         0         0         0         1         2         3         4         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         6         7         6         7         10         12         13         15         16           0         0         0         0         1         2         3         4         6         7         6         7         10         12         13         15         16					-	1	-		-	-	-			_			
0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16 0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16							-	_		_	+	-		_			
0 0 0 0 0 1 2 3 4 6 7 6 7 10 12 13 15 16					-	Ť	-	į	Ī		+		_		-		
							_	-	-	-	+				_		
				-		_		_	_					_	l		_

NIF BULKHEAD SHELL

DISPLAY= SY

/1000 . NODE=

1. SURFACE=

0

0	0	D	0	0	0	0	n	O.	Ы	0	3	3	5	В	8	В	8
0	0	0	0	0	6	ō	0	-		ö	3	3	5	8	8	8	8
D	0	0	ō	o	0	ō	ō	-	ō	+	3	3	5	В	8	8	8
0	0	۵	0	0	а	0	0	0	ď	0	3	3	5	8	8	В	8
Ō	0	8	0	0	0	0	c	0	0	o,	3	3	ន	В	8	8	8
0	0	0	0	0	0	0		-	0	٠.	9	3	5	В	8	В	8
0	0	0	C	0	0	0	0	-	미	-+	3	3	5	8	8	В	8
0	0	0	0	0	0	0	-	0	Н	-+	3	3	5	8	8	8	8
0	0	0	0	0	0	0	·-	┵┥	밉	-+	.3	3	5	В	8	8	8
O	0	0	0	0	0	Ō	0	-		-+	3	3	5	В	8	8	8
0	0	٥	0	0	0	0	⊢	0	Н	+	3	3	5	В	8	8	8
C	0	g.	0	0	0	0	0	0	2	미	3.	3	5	8	8	8	8
D	0	C	0	0	C		0	0	2	0	3	3	- 5	В	8	8	8
0	0	0	0	0	0	0	0.	0	0	0	3	3	5	8	В	8	В
0	0	۵	0	0	٥	0	0	0	c		3	3	5	8	9	8	8
0	0	0	0	0	0	0	0	0	0	0	3	3	5	В	8	B	8
0	a	Đ	0	0	0	O	0	o	ø	o	3	3	5	8	8	8	9
១	0	0	Ç	9	0	O	۵	C	o,	0	3	3	5	8	8	8	8
0	0	O	0	0	0	0	٥	0	0	Ū	3	3	5	8	8	В	8
0	0	Œ	0	٥	0	٥	٥	0	o	o	3	э	ន	8	8	В	8
O	0	0	0	0	0	0	0	0	c	0	3	3	5	В	8	8	8
0	a	۵	0	0	O	0	0	0	0	0	Э	3	5	8	8	8	8
0	٥	0	0	0	0	0	0	0	p	a	3	3	5	8	8	6	8
0	0	0	ŋ	0	0	0	0	0	o	0	Э	3	5	8	9	8	8
0_	٥	a .	0	0	٥	0	٥	0	o	c	3	3	5	8	8	8	8
0	0	O	0	0	0	Ō	0	a	0	o	3	3	5	В	8	В	. 8
٥	O	0	0	Đ	٥	0	Đ	o	0	o	3	3	5	е	8	8	8
0	0	0	0	0	0	0	0	Ŋ	Ö	o	3	3	5	8	В	8	8
0	0	D	0	٥	Q	۵	O	0	o	٥	3	3	5	В	8	В	8
0	O	0	0	0	ū	0	0	0	c	o	3	3	s	В	8	8	8
0	0	0	a	0	0	0	o	0	0	o	3	Э	5	8	8	В	8
0	0	0	0	0	0	0	0	0	0	0	3	3	5	В	8	В	8
0	ū	0	Ç	0	o	ø	0	0	-4	-	3	3	5	8	8	8	8
0	0	0	0	D	0	0	C	0	ρĺ	٥	3	3	5	8	8	В	8
0	О	0	0	0	0	0	0	-	_	C)	ίu	3	5	8	8	В	8
0	0	0_	0	0	0	0	0		***	2	Э	3	5	8	8	6	8
0	0	0	0	0	0	0	0	0	-	-	3	3	5	8	8	В	8
0	0	0	0	0	0	0	_	0		믜	3	3	5	В	8	8	8
0	0	0	0	0	0	0	0	-	-	ㅐ	3	3	5	В В	8	8	8
							۳-	<b>,</b> V.	-	=1	-		<u> </u>				لــــا

SPEC 5.1 NTF BULKHEAD

Q 36 SCALE

DISPLAY= SY /1000 , NODE= 1 , SURFACE= 1

							_							-		
0	0	i	1	2	2	1	_	1 4		3	3	3	7	9	9	8
0	0	1	1_	2	2	1			*-	a)	3	3	7	9	9	8
0	0	1	1_	2	2	1	어	-	Н	3	3	3	7	9	9	8
0	0	1	1	2	2	1	占占	111	-	3	3	3	7	9	9	8
0	0	1	1	2	2	i	5 5		-	3	3	3	7	9	9	8
0	0	1	1	2	2	1	ŏ	1	-	3	3	3	7	9	9	8
0	a	1	1	2	2	ī	Ġ	-	Н	3	3	3	7	9	9	8
0	0	1	1	2	2	1	ō	₩.	-	3	3	3	7	9	9	8
0	0	1	1	2	2	1	0		_	3	3	3	7	9	9	В
0	0	l l	1	2	2	1	0	-	7	3	3	3	7	9	9	8
0	0	i	ī	2	2	1	C.	1	н	3	3	3	7	9	9	8
0	0	1	1	2	2	1	D.	+	7	3	3	3	7	9	9	8
0	0	1	1	2	2	1	0		,	3	3	3	7	9	9	8
e	0	1	1	2	2	ı	c	141	7	3	3	3	7	9	9	8
0	0	1	1	2	5	1	o.	+	7	3	3	3	7	9	9	8
0	0	1	1	2	2	1	0-	14	7	3	3	3	7	9	9	8
0	0	1	1	2	2	1	ū	ы	7	3	3	3	7	9	9	8
0	0	1	1	2	2	ī	O-	14	7	3	3	3	7	9	g);	8
Ď.	0	1	1	2	2	1	D	1	7	Э	3	3	7	9	9	8
0	0	1	1	2	2	1	0	1	7	3	3	3	7	9	9	8
0	0	L	1	2	2	1	o-	H	7	3	3	3	7	9	9	8
C	0	1	ı	2	2	1	0	1	7	3	3	3	7	9	9	8
0	0	ı	1	z	2	1	D-	Н	7	3	3	.3	7	9	9	. 8
0	0	ı	1	2	2	1	0-	1	7	3	3	3	7	9	9	8
0	0	1	1	2	2	!	0	1	7	3	3	3	7	9	9	8
0	۵	l.	1	2	2	1	O.	ы	7	3	3	3	7	9	9	8
0	0	ı	i	2	2	1	O.	1	17	3	3	3	7	9	9	8
D	0	ı	1	ε	2	1	0-	1-	7	Э	3	3	7	9	9	8
0	۵	ı	1	2	2	1	0-	1-	7	3	3	3	7	9	9	8
0	G	1	1	2	2	1	G.		17	3	3	3	7	9	9	8
0_	0	1	1	2	2	1	0-	1-	17	3	3	3	7	9	9	8
0	0	1	1	2	2	1	C	1	7	3	3	3	7	9	9	8
0	0	ì	1	2	2	1	C.	H	17	3	3	3	7	9	9	8
0_	0	1	1	2	2	1	0	1	17	3	3	3	7	9	9	8
D	0	l	1	2	2	1	0		<u> 1</u> 7	3	3	3	7_	9	9	8
0	0	<u> </u>	1	2	2	1	C	1 1	17	3	3	3.	7	9_	9	8
0	0	1	1	2	2	1	0	片	[7	3	3_	3	7	9	9	8
0	0-	1 -	1	2	2	$\frac{1}{1}$	0	뱎	1/	3	3	3	7	9	9	8
0	1 0	<u> </u>	ш <u>т</u> —	٤.		11	بن	I.T	<u> </u>	LJ_	وـــــــــــــــــــــــــــــــــــ	1_3_	<u>'</u>	<u></u>	<u></u>	<u> </u>

NTF BULKHEAD SHELL

DISPLAY= SY /1000, NODE= 1, SURFACE= 2

\ 100	,	1.4	וטט		•		7	•	,		JUI	(EH	٠ ــا ح	_	_	
0	۵	-i	-5	-2	-2	1	0	1	4	7 3	4	6	9	6	6	7
0	0	-1	-2	-2	-2	1	0	1	Η	7 3	4	. 6	3	6	6	7
Ō	0	-1	-2	-2	-2	1	10	1	Ы	-	4	6	3	6	6	7
0	0	<u>-l</u>	-2	-2	上2	1	0	1	1	<u>7 3</u>	14	6	9	6	6	7
<u>, 0</u>	0	-1	-s	-2	-5	1	10	1	비	┯	4	6	9	6	6	7
0	0	-1	-2	-2	-2	1	0	1	Ц	-	<u>  4</u>	6	9	6_	6	7
0	0	-1	-2	-5	-2	1	ㅁ	-	1		<u> 4</u>	6	9	5	6	7
0	0	-1	-2	-2	2	1	0	1	٠.	-+-	14	6	9	- 5	6	7
0	0	-1	-2	-2	-2	1	0	1	1	7 3	4	6	9	6	6	7
0	a	-1	-2	-2	-2	1	0	1	4	<u>7  3</u>	4	5	9	6	6	7
0	0	-1	-2	-2	-2 -	1	٥	1	4	7 3	4	6	3	6	6	7
0	0	-1	-2	-2	-2	1	0	1	1	7 3	14	6	9	6	6	7
0	0	-1	-2	-2	-2 -	1	ů	1	4	7 3	4	6	3	6	6	7
0	0	-1	-2	-2	2.	1	0	1	ų	7 3	4	6	9	6	6	7
0	Û	-1	-2	-2	-2	1	0	1	7	7 3	ų	6	9	6	6	7
a	0	-1	-2	-5	-2 -	1	0	1	4	7 3	4	a	9	6	6	7
C	ū	-l	-2	-2	-2	1	0	1	ų.	7 3	4	6	9	6	6	7
ប	٥	L	-2	-2	-5 -	1	o	1	4	7 3	ц	6	9	Б	6	7
0	Û	-1	-2	-2	-2 -	1	٥	1	4	7 3	4	6	9	6	6	7
0	۵	-L	-2	-2	-2 -	1	٥	1	4	7 3	4	6	9	6	6	7
0	a	-1	-2	-2	-2 -	1	0	1	4	7 3	4	6	9	8	6	7
0	۵	-1	-2	-2	-2 -	1	0	1	4	7 3	4	6	9	6	6	7
0	a	-1	-2	-2	-2 -	-1	0	1	4	7 3	4	6	9	6	5	7
0	Q	-1	-2	-2	-2	1	0	***	4	7 3	4	6	9	6	6	7
0	٥	-1	-2	-2	-2 -	1	٥	1	·Ł.	7 3	4	6	9	6	ô	7
0	0	-1	-2	-2	-2 -	1	٥	1	1	7 3	4	6	9	6	6	7
0	0	-1	-2	-2	-2 -	1	0	1	1	7 3	4	5	9	6	6	7
O	0	-1	-2	-2	-2 -	1	О	1	4	7 3	4	8	9	6	6	7
Ö	0	-1	-2	-2	-2	1	0	1	4	7 3	ч	5	9	6	6	7
0	0	-1	-2	-2	-2 -	1	0	1	4	7 3	4	6	9	6	5	7
0	O .	-L	-2	-2	-2 -	1	0	1.	4	7 3	4	6	9.	6	. 6	7
0	Ü	-1	-2	-2	-2 -	1	O	1	4	7 3	4	6	9	6	6	7
0	0	-1	-2	S	-2 -	1	0	1	4	7 3	ų.	6	9	6	6	7
D	0	-1	-2	-2	-2 -	1	0	1	4	7 3	ų	6	9	6	6	7
0	ū	- <u>I</u>	-2	-2	-2	-1	Đ		4	7 3	4	6	9	6	6	7
0	.0	-1	-2	-2	2	1	Ö	1	4	7 3	4	6	9	6	6	7
ū	0	-1	-2	5	-2 -	1	Ō		4	7 3	Ч	6	9	6	6	7
0	0	-1	-2	2	-2 -	1	0	-	-	7 3	4_	6	9	6	6	7
0	0	-1	-2	-5	-2 -	1	_	_	4	7 3	4	6	9	6	5	7
0	0	<u>-1</u>	-2	-2	-2 -	1	0	1	4[	7  3	1 4	6	9	6	6	_7

SPEC 5 1 NTF BULKHEAD SHELL

Q 36 SCALE

ORIGINAL PAGE IS OF POOR QUALITY

n12	PLHY=	SX	/1000 <b>,</b>	NODE=	1,	SURFACE=	n		1/1/1
		1 1 1					Ū		
		4 1	THE PARTY OF THE P						
	1	5 2 2	2 2 4	THE					
		000	0 0 2 2	2 4 4	3				
	-2 -2 -2	-2 -2 -2	T + 0	$\sqrt{\frac{2}{2}}$	47.47				
	-3 -3 -3	T-3 1-1	-5 -5 -5	/°/``/``	\ 5 \\ \frac{1}{4}				
	-4 -4 -4	-4 L4 L3	[-3 /-3 / -3 / -3 / -3	2/-2/0	$\frac{2}{2}$	2 74 75			
	5 -5 -5		4 -4 -4 -3 -3	-3 -2 -2		2 2 4 3 5	i.		
	-6 -6 -6	Eo /-6	15 5 5 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4	\\^3/ <sub>-3</sub> \\^\`	/-2 /\	,	S. T.		
	17 17 17 1.	7	7 -6 -6 -6	-4 5 -4 -3	, .	$^{5}$ $\times$ $^{0}$ $\times$ $^{5}$ $\times$ $^$			
	7 8 8 8	17/17/		Z6 X 24 Z	\[\frac{-3}{-3}\]	-2 0 2 2			
	8 8 8 8	# F F F F F F F F F F F F F F F F F F F	48 /7 /7 /-1/-1	7 5 5 5	-3 -3 -3	<u> </u>	2	k	
	77777	7 2 7 3 7 8 7 8	8 8 8 8 8	\[\frac{1}{7},\frac{1}{5}\]	×5×-4	-3 -2 0	2 2 4 5		
			777 8 8	۲۶×۲-۱/	X-6 X 5	-4 \ -3 \ -2 \	0 2		
		FIFT		X-28/X-	7_7 ~6	5 -4 -3 -2	2 2	1 7 7 7	
				X8 X-7 X	X-7_7	5 5 -4 -3 X		2 14 15	
				\$17\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	-8/-7	7 -6 5 -4 -3	Y-2 X	2 1454	
					\ <sup>8</sup> _7\	27 X 2\5\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	3 -2 10	2 13 5	
				77.7	8 -7 -8	7 6 5 7		2 1 5 1	
				77	-8 -8	2 101-1	1-3-1-2	0 2 115	1
			-		7 -8	7 -7 -7 -6 5	4 -3 -2	10/2/1	
				\frac{1}{2}	\$7 1-8 7 1-8	1-8 1-7 1-6 5	1-2	10 19	T]  =   -
				7	# 21-8	7 167	5 - 1 - 3 - 2	10 14	1514
					出	8 7 7	5 -4 -3 -	2 10 10	1 15 H
					题	-8 -8 -7 -6 -8 -8 -7 -6	151-1	2 0 2	4 55
					1717	-8 -8 -7 -6	191 - 1	-2 0 2	4 5 4
					7-17-7			-2 0 2	4 5 B
PEC	NT	F_BULH	(HEAD				<del></del>		
•1	DO	ME						<u>Q.</u> S	CALE 26

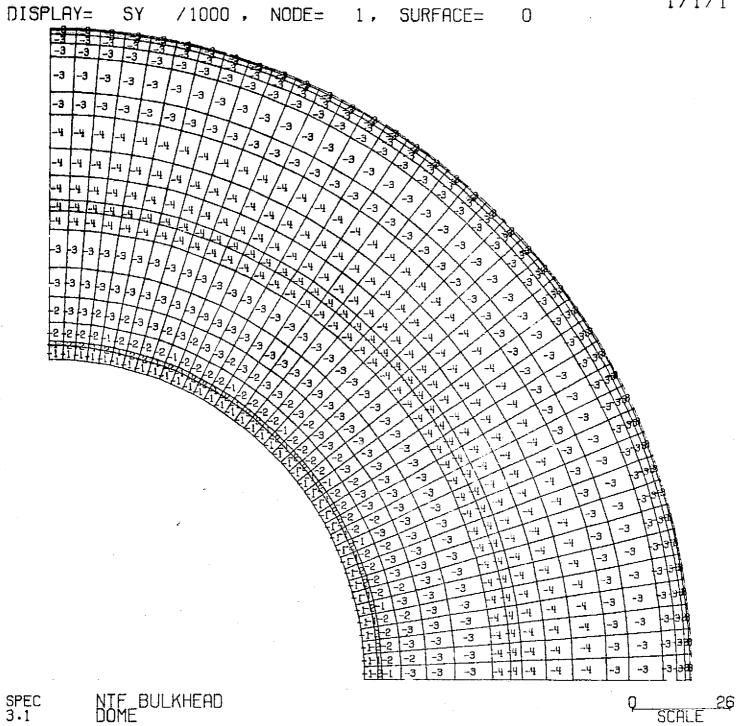
F16 40

/1000 . NODE= 1 . SURFACE= 1 SX DISPLAY= -8 NTF BULKHEAD DOME SCALE

OPTIMAL FACE D

DISPLAY=	SX /1000.	NODE=	1.	SURFACE=	2	• • • • • • • • • • • • • • • • • • •
6 6 6	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	6 6 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6		1
SPEC N	ITF_BULKHEAD IOME		† <u>?</u>	8-7 -8 -9 -8 7-7 -4 -12 -8	-5-6 -5   -4   -3   -	Q SCALE
_					•	

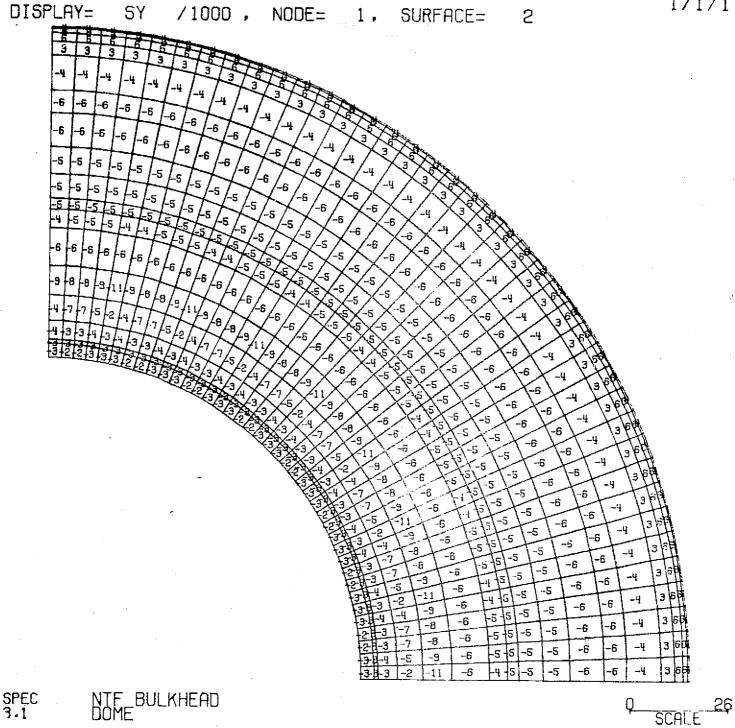
F1642



DISPLAY= SY	/1000 .	NODE=	1.	SURFACE=	1	•	1/1/1
-2 -2 -2 -2 -2		To the					
-1 -1 -1 -1 -1	-2 -2 -2	2 2 2 3					
-1 -1 -1 -1 -1		$\frac{1}{1} = \frac{-2}{-2} = \frac{-2}{-2}$	ZZZ	The same of the sa			
-2 -2 -2 -2		1-1-1	/-2 /-2				
-3 -3 -3 -3 -3	1 -2 -2 -2	-1 -1 -1	\-1\X	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	<del>l</del> in		
-3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	13/3/3/3	\frac{-2}{2}\frac{1}{2}\frac{1}{2}	. /~ /	-1 $-2$ $-2$ $-3$ $-2$ $-3$	XXXX		
-1 -1 -1 -1 -1 -1		1-3 /-2/ 3 /-3 /-2/	-2 -2 -2	-1 -2 -2			
3 2 2 3 5 3 2	ff <sup>1</sup> f <sup>1</sup> f <sup>1</sup> f <sup>1</sup>	3333	/_\_/-2 /	$^{2}$ $^{-1}$ $^{-1}$	-2 \\\ -2 \\\ -2 \\\ \]	X	
1 1 2 0 5 1 1	$\begin{bmatrix} 2 & 3 & 5 & 3 & 2 & 2 \\ 2 & 0 & 5 & 3 & 2 & 2 & 2 \\ \end{bmatrix}$	$\begin{bmatrix} -1 \\ -1 \end{bmatrix} = \begin{bmatrix} -3 \\ -3 \end{bmatrix}$	3 3 3 3 3	3 2 2 -1	1 -2 -2		÷
0 0 0 1 2 0 0 0	F1/2/1/2/	′5/3 X_/~1/,	X-3 X 3 X 3 X 3 X 3 X 3 X 3 X 3 X 3 X 3	3 -3 -2 -1	-1 -2		
		2/2/3/	-1/1	13 3 -3 -2 -2 -3 3 3 -3 -2 -2 -2 -3 3 3 -3 -3 -2 -2 -2 -3 3 3 -3 -3 -2 -2 -2 -3 3 3 -3 -2 -2 -3 3 3 -3 -2 -2 -3 3 3 -3 -2 -2 -3 3 3 -3 -3 -2 -2 -3 3 3 -3 -3 -2 -2 -3 3 3 -3 -3 -2 -2 -3 3 3 -3 -3 -2 -2 -3 3 3 -3 -3 -2 -2 -3 3 3 -3 -3 -2 -2 -3 3 3 -3 -3 -2 -2 -3 3 3 -3 -3 -2 -2 -3 3 3 -3 -3 -2 -2 -3 3 3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	-1 -1	2 3	1
		0 2 0 5 3	2)\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	3 3 -3 -2	2 -1 -1	2 \ 49.13	alle control
	*		$\begin{pmatrix} 2 \\ 3 \\ 5 \end{pmatrix}$	-1 $-3$ $3$ $-3$ $-3$ $-3$ $-3$ $-3$	1-1-1	1 -2 3	
		VI V 1	25 2-1 3	2 -1 +3 +3 +3 +3 +3 +3 +3 +3 +3 +3 +3 +3 +3	3/-3/-1	7-1	13 1 th
	<u></u> .	71.00		3 -1 +3 3	1-3 -2	1-1	12 H
		¥	1012	5 3 -1 3	13 3 -2	-1 -1	2 13
				2 2 -1	3 3 -3 -2	T-1 -1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	-2 19
			甘	2 -5   5   -1	3 3 3 -2	+	-2 19141
	٠		回	0 1 2 -1	-3 -3 -3 -	2 -1 -1	-2 <del>9</del> 14
				0 2 5 -1 0 3 -1 2 -5 5 -1		2 -1 -1	-2 -9 -10
SPEC NTE B	BULKHEAD		1.4	FL 37 - L L			0 26
SPEC NTF E 3.1 DOME	BULKHEAD						SCALL

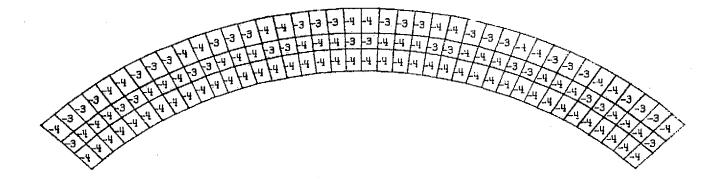
F16 44





ORIGINAL PAGE IS

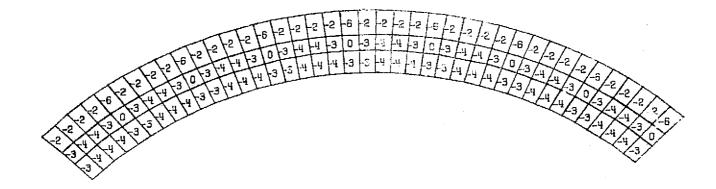
FIG 45



SPEC NTF BULKHEAD 2.1 FLANGE SURFACE

Q 21 SCALE

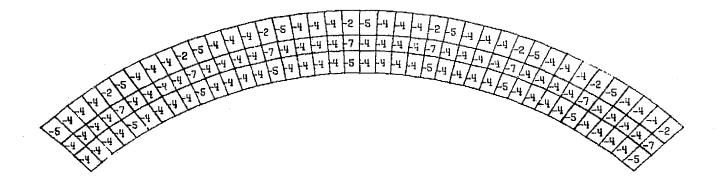
F16 46



ORIGINAL PAGE IS OF POOR QUALITY

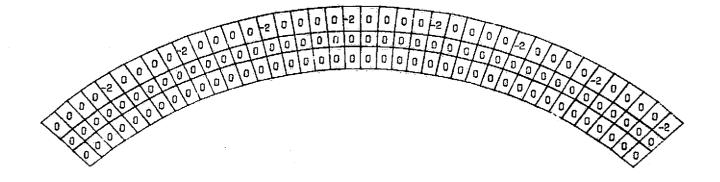
SPEC NTF BULKHEAD

o 21 SCALE



SPEC NTF BULKHEAD ?.1 FLANGE SURFACE

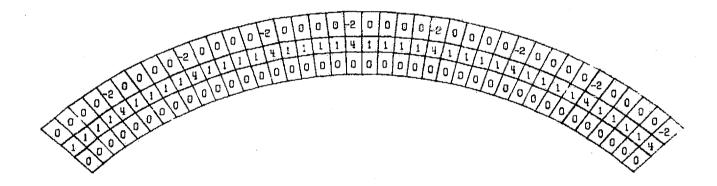
0<u>21</u> SCALE DISPLAY= SY /1000 . NODE= 1 . SURFACE= C



SPEC NTF BULKHEAD 1 FLANGE SURFACE Q SCALE

1/1/1

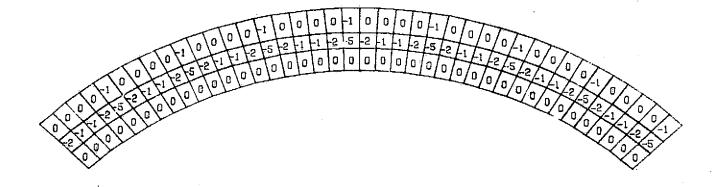
DISPLAY= SY /1000 , NODE= 1 , SURFACE= 1



SPEC

NTF BULKHEAD FLANGE SURFACE Q 21 SCALE

F1650



ORIGINAL PAGE IS OF POOR QUALITY

SPEC NTF BULKHEAD 2-1 FLANGE SURFACE Q 21

1/1/1

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 0

Į.		1	4	- <b>4</b>	ц.	4	-4	-4	4	-4	-4	-4	-4	-4	-4	-4	.ų	-4	-ч	_4	4	-4	-4	.4	4	.ų	_ų	-4	-4	<u>-4</u>	-4	.ц	-4	ц	4	4	ч.	ч	ч.	ц
-(	3 -6	5	6	-6	-6	6	-6	-6	-6	-6	-6	-5	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	6	6
ŀ	7	7	7	7	-7	7	-7	-7	-7	-7	-7	7	-7	-7	7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	7	-7	-7	-7	-7	7	7	7	-7	7	7	7	7

SPEC

NTF BULKHEAD HATCH OPENING

5	5	;	5	-5	-5	-5	-5	-5	-5	-5	-5		5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-6	-5	-5	-5	-5	-5	-5	-5	-5	5	5	5	5
6	-6	,	6	-8	-6	-6	-6	-6	-5	-6	-	-	6	-6	-в	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	6	6	6	6	ε
7	17	7	6	·G	-7	-7	-7	-6	-6	-7	- 7	Ŀ	7	-6	-6	-7	-7	-7	-8	-6	-7	-7	-7	-6	-13	-7	-7	-7	-6	6	<u>-</u> 7	-7	-7	-6	6	-7	-7	7	6	Б	7

SPEC 10.1 NTF BULKHEAD HATCH OPENING o 18 SCALE

1/1/1

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 2

-4	4	4	ļ	4 -	4	-4	-4	-4	-4	-4	-4	-14	-4	-4	-4	-4	-ц	-4	ų	-14	-4	ч	-4	-4	-4	ւլ	-4	_ų	-4	-4	ų	-4	-4	7	4	-4	ų	-4	4	기 된 - 기
	-5	-5	· [.	5	6	-6	-5	-5	-5	-6	-6	-5	-5	-5	-6	-6	-5	-5	-5	-6	-6	-5	-5	-5	-6	-6	-5	-5	-5	-6	-6	-5	-5	-5	6	6	-5	-5	-5	6
-7	7	-7	Ŀ	7	7	7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	7	-7	7	-7	7	7

SPEC

NTF BULKHEAD HATCH OPENING Q <u>SCOLF</u> 18

F1654

	1 -	1	-1	-1	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-i	-1	-1	-1	-1	-1	-i	-1	-1	-1	- <u>t</u>	-1	-1	-1	-1	-1	-t	-1	-1	1	
ļ	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1-	-1	-1	-1	. !	1	1
	0	0	-1	-1	0	0	0	-1	-1	O	0	0	-1	-1	C	0	0	-1	-1	0	0	0	-1	-1	0	0	0	-1	-1	0	0	٥	-1	-1	0	0	0	٠١	-1	c]

ORIGINAL PAGE IS OF POOR QUALITY

SPEC NTF BULKHEAD 10.1 HATCH OPENING Q 18 SCALE

[	2 - 2	2	-2	-2	}	2	-2	-2	-s	Ę	2	-2	-2	-2	-2	-2	-2	-2	-2	5	-2	-2	-2	-2	2	-2	-2	-2	-2	-2	-2	-2	2	2	-2	-2	5	2	-2	2	2	-7 -2
ŀ	1	1	2	١,	1	1	1	-1	-2	-1		-I	1	-1	-2	-1	-1	-1	-1	-2	-1	-1	-1	-1	-2	-1	-1	-1	-1	-2	-1	-1	-1	-1	-2	-1	-1	-1	-1	-2	1	1
1	) ]	IJ	0	c	ı	1	0	1	0	(	1	1	٥	1	0	O	1	۵	1	٥	٥	1	n	1	0	0	1	0	1	Ü	0	1	0	1	0	0	1	٥	1	0	0	

SPEC 10.1 NTF BULKHEAD HATCH OPENING Q 18

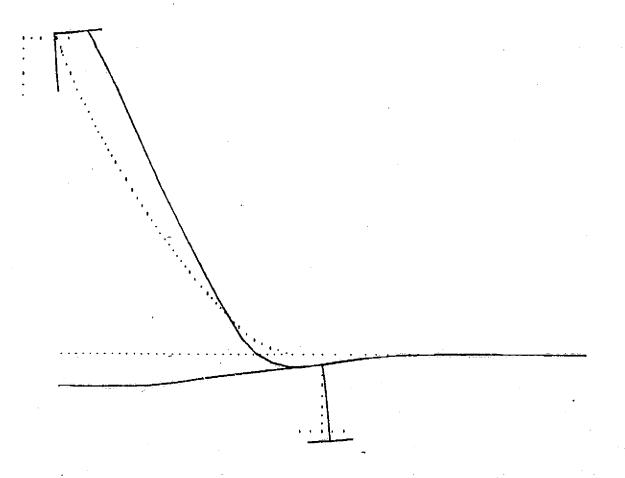
1/1/1

DISPLAY= SY /1000 . NODE= 1 . SURFACE= 2

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	l	1	1	1	1	1	1	1	1	Ĺ	1	1	1	1	1	1	į	1	1	1	1	1	1	i i	:
0	0	0	0	0	0	0	0	O	0	0	0	0	O	0	O	ū	0	O	0	D	0	0	0	0	0	0	O	0	0	0	0	0	0	0	0	0	σ	o	0
0	0	2	2	-1	0	0	-2	-2	-1	0	9	2	-2	-1	D	O	-2	2	-1	0	0	2	-2	-į	0	0	-2	-2	-1	0	0	-2	-2	-1	G	IJ	-2	2	1

SPEC 10-1

NTE BULKHEAD HATCH OPENING Q <u>SCOLE</u> 18

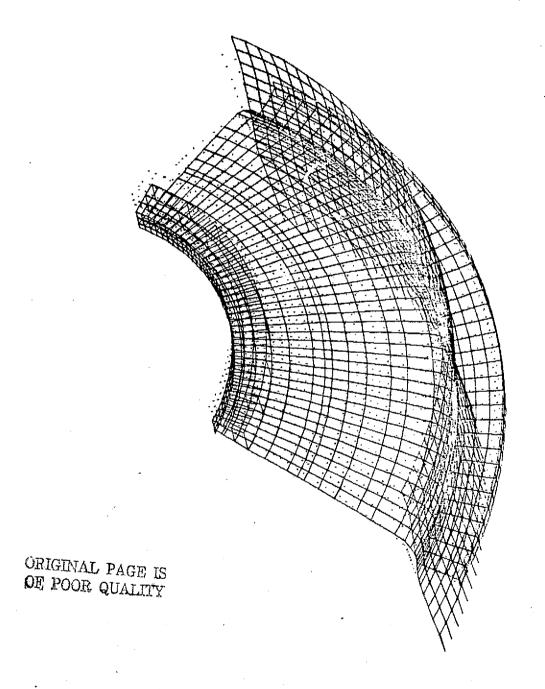


SPEC 12-1

NTE BULKHEAD CROSS-SECTION VIEW 0 <u>scale 27</u>

ORIGINAL PAGE IS
OF POOR QUALITY

F1658



SPEC 1 · 1 NTE BULKHEAD ...VALVE OPEN AND TEMP DIST Q 44 SCALE

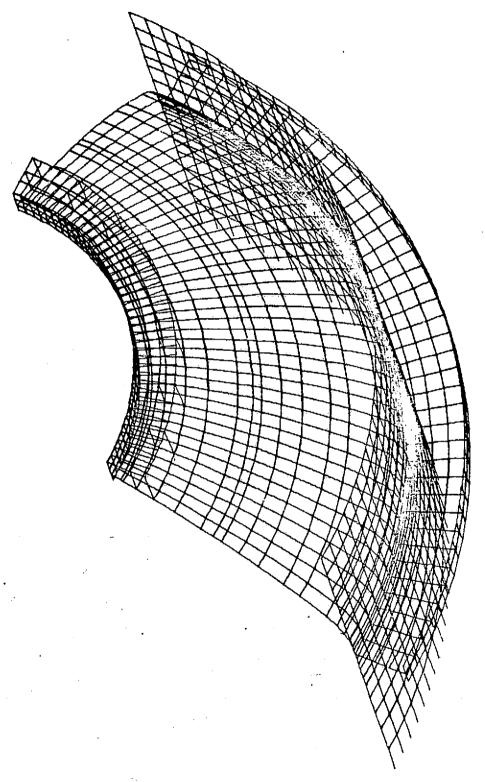
F1 G 59

## CASE Z

GATE VALUE OPEN STRESS PLOTS

FIGURES 60 THRU 86

COMPUTER RUN NO. LEH



"NIE BULKHEAD

SCALE 41

F16.60

DISPLAY= SX

/1000 , NODE= 1 , SURFACE= 0

5	5	5	4	4	4	4	4	4	H	Ы	5	5	8	11	14	15	ιs
5	5	5	4	4	4	4	4	4	4	4	5	5	8	11	14	15	16
6	ь	6	ų	ц	4	ų	4	ų	H	14	5	5	8	11	14	١S	16
5	5	5	4	4	14	4	4	•	•	-	5	S	8	11	14	เร	16
<u> </u>	8	5	ų	4	4	4	4	Ξ.	븬	Ξ.	5	Б	8	11	19	15	16
5	Б	5	4	4	4	4	4	•	H	-	5	5	8	11	14	15	15
5	5	<u>6</u>	4	4	4	4	4	•	Ċ		5	5	8	11	14	15	16
5	5	5	4	4	4	4	4	-	빈	Н-	5	(a)	8	11	14	15	lБ
<u> </u>	5	5	ų	4	4	4	4	٠.	۲	-	5	5	8	11	14	15	l6
5	5	5	4	4	4	4	7	-	Ľ	,	5	5	8	11	14	15	16
5	5	5	ű	4	4	4	4	4	H	1	5	5	8	11	1.4	15	16
5	5	5	ų	4	4	4	4	4	Ŀ	빈	5	5	a	11	14	15	េត
5	5	5	ų	4	4	4	4	4	4	7	5	5	8	11	14	15	16
5	5	5	ij	4	4	4	4	1			7	ιs	8	11	14	15	16
5	5	5	ч	ч	ц	4	4	ų	Ą	4	5	5	8	11	14	15	មេ
5	5	5	ų	4	4	4	4	ų	H	y	5	5	8	11	14	15	16
5	5	ß	Ĥ	4	4	4	4	4	4	H	5	5	හ	31	14	15	l£
5	S	5	Ą	4	4	4	ц	ų	ŀ	3	5	ณ	8	11	14	15	16
5	ស្រ	5	¥	4	4	4	4	4	4	4	S	5	8	1 L	14	15	16
5	5	5	ij	4	ч	4	4	4	H	7	5	5	8	11	14	ខេ	16
5	5	5	4	4	4	4	4	ų	H	4	5	5	8	3 L	14	15	เธ
ş	5	5	ų	4	4	4	ų	4	H	4	5	5	8	11	14	15	16
5	5	5	ų	ц	ч	4	4	4	4	4	5	5	8	31	14	15	16
5	5	5	¥	4	4	4	ų	ų	4	7	5	5	8	11	14	15	ιs
Б	Ø	5	ų	4	#	4	ų	ų	H	71	S	ß	8	3.1	14	15	16
5	5	5	ų	4	4	4	4	ų	H	27	5	5	පි	3 L	14	15	15
5	c)	cu	4	4	4	4	4	ų	ų	37	Б.	5	8	3 L	14	Į5	16
5	5	55	4	4	4	4	4	4	H	4	5	5	ਲ	3 L	14	15	15
5	5	5	4	ų	4	4	4	ų	4	-	5	S	8	11	14	15	16
5	5	5	4	4	4	4	4	'n	1	4	5	S	8	31	14	15	เธ
5	5	5	4	4	4	4	4	4		ij	5	5	8	1.1	14	15	16
5	5	S	4	Ц	4	4	4	4		4	ទ	5	8	31	14	15	18
চ	ឆ	5	ų	4	4	4	4	ų	1	4	5	5	8	11	14	ιs	16
8	5	5	9	#	4	4	ij	¥		ij	5	5	8	11	14	15	ίE
Ð	5	5	4	4	4	4	4	ų	Ы	4	G	5	8	11	14	15	l6
চ	5	5	ų	4	4	4	4	4	Н		5	5	8	11	14	เร	LS.
5	5	5	4	4	4	4	4	4	Н	-	5	5	8	11	14	15	16
5	5	5	4	4	-	4	4	4	μ		5	5	- 8	11.	14	15	16
5	5 5	\$ 5	7	4	7	9	4	4	H		S S	5 5	8	11 11	14	15 15	16 16
	ָ כ	<u> </u>	4	لتا	بات	17.	7	1.1	C	म	٠		<u> </u>			[ []	1.0

SPEC

NTF BULKHEAD HELL 0 36 SCALE

5         5         5         4         4         4         4         4         5         5         7         1         1         14         16         16         6         6         5         9         4         9         9         9         9         9         9         9         9         9         1         1         14         16         16         6         6         6         9         9         9         9         7         11         14         16         16         6         6         6         9         9         9         9         7         11         14         16         16         16         6         6         6         9         9         9         9         7         11         14         16         16         16         6         6         6         9         9         9         9         7         11         14         16 </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>_</th> <th>_</th> <th>_</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>							_	_	_								
6         6         9         7         11         14         16         16         6         6         6         6         9         9         9         9         9         7         11         14         16         16         16         6         6         6         9         9         9         9         7         11         14         16					_		4				4	4	7	_	14		
5         5         5         9         7         11         14         16 <td< td=""><td></td><td></td><td></td><td>*******</td><td>-</td><td></td><td>_</td><td></td><td></td><td></td><td>_</td><td></td><td></td><td></td><td>_</td><td></td><td></td></td<>				*******	-		_				_				_		
5         5         5         4         4         9         4         9         7         11         14         16         16           5         5         5         4         9         9         9         9         9         14         9         7         11         14         16         16           5         5         5         7         9         9         9         9         9         14         9         7         11         14         16         16           5         5         5         9         9         9         9         7         11         14         16         16           5         5         7         9         9         9         7         11         14         16         16           5         5         7         9         9         9         9         7         11         14         16         16           5         5         7         9         9         9         9         7         11         14         16         16           5         5         9         9         9         9 <t< td=""><td></td><td></td><td></td><td></td><td>-</td><td></td><td>₩</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>_</td><td></td></t<>					-		₩									_	
5         5         5         9         7         11         14         16         16           5         5         5         9         9         9         9         7         11         14         16         16           5         5         9         9         9         9         7         11         14         16         16           5         5         9         9         9         9         7         11         14         16         16           5         5         9         9         9         9         7         11         14         16         16           5         5         9         9         9         9         7	l				-		+	-	-	_	_			_			_
5         5         6         4         5         7         1					-	۱÷	+		_		_						
5         5         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         4         5         5         5         6         4         4         4         4         5         5         1         1         4         4         4         5         5         4         4         4         4         5         5         4         4         4         4         5         5         4         4         4         4         5         5         4         4         4         4         4         5         5         4         4         4         4         5         5         4         4         4         4         5         5         5         4         4         4         4         5         5         5         4         4         4         4         5         5         5         7         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1						-	+-				-			-		_	
5         5         5         4         4         4         4         5         5         7         11         14         16         16         5         5         5         4 <td></td> <td></td> <td></td> <td></td> <td>-</td> <td>-</td> <td>٠.</td> <td></td> <td>_</td> <td></td> <td><u> </u></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>					-	-	٠.		_		<u> </u>						
5         5         5         4         4         4         4         5         14         4         4         4         5         14         4         4         4         5         14         4         4         4         5         14         4         4         4         15         14         4         7         11         14         16         16           5         5         5         4         4         4         9         14         9         7         11         14         16         16           5         5         5         4         4         4         9         14         9         7         11         14         16         16           5         5         5         4         4         4         9         14         9         7         11         14         16         16           5         5         5         4         4         4         9         8         9         7         11         14         16         16           5         5         5         4         4         4         9         8         9 <td< td=""><td></td><td></td><td></td><td></td><td>-</td><td>-</td><td>┿</td><td><b>├</b>─</td><td>_</td><td></td><td></td><td></td><td></td><td><del></del></td><td></td><td></td><td></td></td<>					-	-	┿	<b>├</b> ─	_					<del></del>			
5         5         4			<del></del>		├-	-	+-	-	_			-	-	-			T-1
5         5         5         4         4         4         4         9         5         4         4         4         9         5         4         4         4         9         5         4         4         4         9         5         4         4         4         9         5         4         4         4         9         5         4         4         4         9         5         4         4         4         9         5         4         4         4         9         5         4         4         4         9         5         4         4         4         9         5         9         1				<u> </u>	-	┝╌	⊢	-	-	-				-			
5         5         4         4         4         4         9         5         4         1		<del></del>		-	<u> </u>	ŀ	-	₽	⊢	++							
6         5         5         4         4         4         4         9         549         4         9         7         11         14         16         16           6         5         5         7         4         9         9         9         7         11         14         16         16           6         5         5         9         4         9         9         9         7         11         14         16         16           5         5         5         9         4         9         9         9         7         11         14         16         16           5         5         6         9         4         9         9         7         11         14         16         16           5         5         6         9         9         9         9         7         11         14         16         16           5         5         7         9         9         9         9         7         11         14         16         16           5         5         7         9         9         9         9 <t< td=""><td></td><td></td><td><del></del></td><td>~~~~</td><td></td><td><del>} `</del></td><td>-</td><td>₧</td><td>-</td><td>н</td><td>_</td><td>ļ</td><td></td><td>11</td><td>_</td><td></td><td></td></t<>			<del></del>	~~~~		<del>} `</del>	-	₧	-	н	_	ļ		11	_		
6         5         5         4         4         4         4         9         9         9         9         7         11         14         16         16           6         5         5         9         4         9         9         9         7         11         14         16         16           5         5         9         9         9         9         9         7         11         14         16         16           5         5         6         9         9         9         9         7         11         14         16         16           5         5         6         9         9         9         9         7         11         14         16         16           5         5         7         9         9         9         7         11         14         16         16           5         5         7         9         9         9         7         11         14         16         16           5         5         7         9         9         9         9         9         9         9         7	5	5	5	4	4	4	14	⊢	-		4	Lj.	7	11	14	16	16
5         5         4	ទ	5	5	ų	4	4	4	4	5	44	ч	4	7	11	14	15	16
5         5         5         4         4         4         4         5         44         4         4         4         5         44         4         4         4         5         44         4         4         4         5         44         4 <td>5</td> <td>5</td> <td>5</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>ទ</td> <td>44</td> <td>4</td> <td>4</td> <td>7</td> <td>11</td> <td>14</td> <td>16</td> <td>16</td>	5	5	5	4	4	4	4	4	ទ	44	4	4	7	11	14	16	16
S         S         S         Y	6	5	s	¥	4	4	4	ц	5	44	4	4	7	ΙĻ	14	16	ι6
5         E         S         Y	5	5	5	¥	4	4	4	4	5	44	4	4	7	11	14	15	16
5         5         5         4	5	5	5	ų	ų	4	4	4	5	44	Ч	ц	7	11	14	16	16
5         5         5         4	5	5	5	4	4	ч	4	4	5	4 4	4	IJ	7	11	14	15	ເຮັ
5         5         4	5	5	5	ц	ч	4	4	ц	5	4 4	4	4	7	11	14	16	lΕ
5         5         5         4         4         9         4         9         6         6         1	5	5	5	ų	4	4	4	4	5	44	ч	4	7	11	14	í8	16
5         5         5         4	ម	ទ	5	ų	4	4	4	y	5	49	4	4	7	11	14	16	١6
5         5         9         9         9         9         9         9         9         7         11         19         16         18           5         5         5         9         9         9         9         9         9         9         7         11         19         16         16           5         5         9         11         14         16         16         16         16         16	5	5	5	ų	4	4	4	4	5	44	ч	4	7	11	14	16	16
5         5         5         4         4         4         4         4         4         4         4         4         7         11         14         16         16           5         5         5         4         4         4         4         4         4         7         11         14         16         16           5         5         5         4         4         4         4         5         44         4         4         4         4         7         11         14         16         16           5         5         5         4         4         4         4         5         44         4         7         11         14         16         16           6         5         5         4         4         4         4         4         4         7         11         14         16         16           5         5         4         4         4         4         4         7         11         14         16         16           5         5         5         4         4         4         4         5         4         7<	5	5	5	4	4	ц	4	4	5	44	4	y,	7	11	14	16	เธ
5         5         5         4         5         44         4         4         4         5         44         4         4         4         5         44         4         4         4         5         44         4         4         4         5         44         4 <td>5</td> <td>5</td> <td>S</td> <td>ų</td> <td>4</td> <td>4</td> <td>4</td> <td>y</td> <td>5</td> <td>44</td> <td>4</td> <td>ij</td> <td>7</td> <td>11</td> <td>14</td> <td>16</td> <td>16</td>	5	5	S	ų	4	4	4	y	5	44	4	ij	7	11	14	16	16
5       5       5       4	5	5	5	4	4	4	4	4	5	14	4	4	7	11	14	16	L6
5         5         5         4	5	5	5	ñ	4	4	4	4	5	44	4	4	7	11	14	16	16
5       5       5       4       4       4       9       5       49       9	5	5	5	Ч	4	4	ų	4	ទ	44	4	4	7	11	14	16	l6
5     5     5     4     4     4     4     4     5     5     4     4     4     4     4     4     4     4     7     11     14     16     16       5     5     5     4     4     4     4     4     4     7     11     14     16     16       5     5     5     4     4     4     4     4     4     7     11     14     16     16       5     5     5     4     4     4     4     4     5     44     4     4     4     4     4     4     5     4     4     4     4     4     5     4     4     4     4     4     5     4     4     4     4     4     4     4     4     5     4     4     4     4     4     5     4     4     4     4     4     5     4	5	ร	5	Ч	4	4	4	4	5	44	4	4	7	il	14	16	16
5       5       5       9	6	5	5	Ч	ц	ч	[4	4	5	44	4	4	7	11	14	16	l6
5         5         5         4         4         4         4         5         4         4         4         4         5         4	5	5	5	Ч	4	ч	4	4	5	44	4	ч	7	11	14	16	ΙB
5         5         9         4         9         7         11         14         16	5	5	5	ų	4	4	4	4	ş	4 4	ц	ц	7	11	14	18	L6
5         5         9         4         9         7         11         14         16	5	5	5	ų	4	4	4	-	_	_	4	4	7	11	14	16	ιĢ
5         5         4         4         4         4         5         6         6         16	5	5	S	¥	4	4	4				4	ц	7	11	14	16	lΒ
5         5         5         4         4         4         4         9         5         49         4         9         5         49         4         9         5         49         7         11         14         16         16           5         5         5         9         4         9         9         9         7         11         14         16         16           5         5         5         9         9         9         7         11         14         16         16	5	5	5	4	4	4	4	4	5	14	4	4	7	11	14	16	16
5 5 5 4 4 9 9 9 9 9 9 7 11 14 16 16 5 5 5 4 9 9 9 9 9 9 7 11 14 16 16	5	5	5	¥	4	4	4	4	5	44	4	<u>. 4</u>	7	11	14	16	เร
5 5 5 4 4 4 4 4 9 5 4 9 9 9 9 9 11 14 16 16	5	5	S		<u> </u>	-	<b>-</b>	_			_			•	14		
						_	-		5	벨	-						
2   2   4   4   4   4   4   4   4   4						—	-						1	+			_
	ב	<u> </u>	<u> </u>	4	4	14	14	14	D.	11[4]	4	4	<u> </u>	11	14	Lb.	_ เช

SPEC

NTF BULKHEAD SHELL ) <u>36</u>

SX DISPLAY=

/1000 , NODE= 1 , SURFACE=

1017								_	_								
- 5	5	চ	4	Ч	ч		14	_			6	7	9	12	13	ιs	L6
<u> </u>	8	5	4	4	4	4	4	12	-	틴	6	7	3	12	13	15	16
<u> </u>	5	5	ų ų	4	4	4	4	4	H	Ĥ	6	7	9	12	13	15	16
5 5	5 5	5	4	4	y y		9	17	<u>;</u>	H	6	7	9	12 12	7.3	15	16 16
<del>- 2</del> -	5	5	14	4	4	4	4	۰	H	<del>} - 1</del>	6	7	9	12	13	15	16
, j	5	5	ų	4	4	Ý	₩.	Ļ	•	•	6	7	9	12	13	15	16
5	5	5	ų	4	4	ų	-	4		-	6	,	9	12	1:3	15	16
5	6	5	4	4	4	4	4				6	7	9	12	13	15	16
5	5	5	4	4	4	4	9	4	Ļ	Ė	6	7	9	12	13	15	16
- 5	5	5	ų	4	4	4	4	-	-	Ē	6	7	9	12	13	15	l6
5	5	5	4	14	y	4	•	4	т	т	Б	7	9	12	13	15	15
5	S	5	4	4	4	4	9	1-	H	Н	6	2	9	12	13	15	16
5	5	5	¥	4	4	4	⊢	₽	H	₩	6	7	9	12	13	15	16
6	5	5	4	4	4	4	4	4			6	7	9	12	13	15	16
5	5	5	Ų	4	4	ų	y	y	ļ	H	6	2	9	12	13	12	16
5	5	5	¥	ų	4	4	y	4	Ļ	5	5	7	9	12	13	15	l5
5	5	5	ų	4	4	4	4	4	-1	5	6	7	9	12	13	15	16
5	5	5	4	14	4	4	4	ų	ļ,	1	6	7	9	12	13	15	16
5	5	5	4	4	4	4	4	4	,	5	6	7	9	12	13	15	16
5	5	5	ų	4	4	4	4	ų	1	6	6	7	5	12	13	15	15
6	5	5	4	4	4	4	4	4	1	5	5	7	9	12	13	15	16
5	5	5	ij	ц	4	4	ij	ų	4	5	6	7	9	15	13	15	16
5	চ	5	ų	4	ч	4	4	ч	H	5	6	7	9	12	13	15	16
5	5	5	ų	4	4	4	4	ų	ļ	5	6	7	9	12	13	re.	18
5	5	5	ц	ц	4	4	4	4	4	5	5	1	5	12	13	15	18
5	5	CJ.	ų	¥	4	4	ij	Ą	4	Б	6	7	9	12	13	18	16
5	5	. 5	ų	4	ч	4	y	4	H	6	6	7	9	12	13	15	lβ
5	5	5	냥	4	4	4	4	4	4	E	6	1	9	12	13	15	16
5	5	5	ų	4	9	4	4	4	H	5	6	7	9	12	13	เร	15
5	5	5	4	4	ч	4	¥	4	Ļ	E	6	)	9	12	13	15	15
5	5	5	ų	4	4	4	4	4	Ļ	6	6	7	9	12	13	15	16
5	ভ	ភេ	ij	4	ų.	4	y	ų	Ę	6	8	7	9	12	13	เร	16
6	ទ	5	Ų	4	ч	4	ų	4	ŀ	5	6	2	9	12	13	15	16
5	S	5	4	4	4	4.	4	4	ij	ē	6	7	9	12	13	เร	16
5	ğ	5	¥	4	ų	4	4	4	ľ	힏	6	7	9	12	13	15	[6]
S	8	Б	4	4	ч	4	4	-	1	目	5	7	9	12	13	เร	16
5	5	1 01	ų	# :	4	4	4	4	Ė		<u>6</u>	7	S	12	13	15	<u> 16</u>
5	5	to u	ų ų	4 4	4	4	y	4	H	5	<u>6</u>	7	9	12 12	13	15	L6
5	1 2	5	7	7	ַ"	7	1.3	1	L1	2	U.			12	13.	נט	[ [0]

E         2         2         2         2         2         1         1         1         3         3         5         6         6         8         6         8		J F						_		۴			001		<i>-</i>			
2	2			<del></del>				Ī	ī	ı	Ĺ				8	8	8	
2					-	-	•	L	1	1	Ц	_				_		
2         2         2         2         2         2         1         1         1         3         3         5         8         8         6         8							+	┝-	+	1	L							
2         2         2         2         2         2         1         1         1         3         3         5         8				<del>}</del>			;−		•	1	۲				_			
2         2         2         2         2         2         1         1         1         3         3         5         8					+			_	•	Н	Н	_	<del>]</del>				<del></del>	
2         2         2         2         2         2         1         1         1         3         3         5         8	<del></del>				+	•	-	-	<u> </u>	Н	-				_			
2         2         2         2         2         2         2         1         1         1         3         3         5         8	<del> </del>	<del></del>			<del> </del>		+-	⊢	┿	ч	-		<u> </u>		}			····
2         2         2         2         2         1         1         1         3         3         5         6         8         8         8         8         8         8         8         8         8				<del></del>	-		<del>-</del> -	_	-	Н	ŀ		<del></del>					
2       2       2       2       2       2       1       1       1       3       3       5       8	<del></del>				<del>-</del>		-	╌	-	Н	Н						<del> </del>	<del></del>
2       2       2       2       2       2       1       1       1       3       3       5       8				<del> </del>	-	<del></del>		<u> </u>	-	Н	+		<u> </u>					-
2       2       2       2       2       1       1       1       1       3       3       5       8	<b></b>			-	<del> </del>	-	╌	-	╀╌	Н	H	_	<del></del>				<del></del>	
2       2       2       2       2       1       1       1       3       3       5       8	2	<del></del>		<del></del>	2	2	2	1	l	Ц	4	3	3	5	8	8	8	8
2       2       2       2       2       2       1       1       1       3       3       5       8       6       8         2       2       2       2       2       2       2       1       1       1       3       3       5       8       8       8       8         2       2       2       2       2       2       2       1       1       1       3       3       5       8 <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>ı</td> <td>1</td> <td>L</td> <td>L</td> <td>3</td> <td>3</td> <td>5</td> <td>₿</td> <td>8</td> <td>8</td> <td>8</td>	2	2	2	2	2	2	2	ı	1	L	L	3	3	5	₿	8	8	8
2       2       2       2       2       1       1       1       3       3       5       6       8	2	2	2	2	2	2	2	L	1	U	1	3	3	5	8	8	8	8
2       2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	L	L	L	ιļ	Ξ	3	5	艮	8	€.	8
2       2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	l	1	1	L	3	3	5	8	8	8	8
2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	L	1	i	L	3	3	5	呂	8	8	8
2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	ι	ı	ı	Į.	3	3	5	8	8	B	8
2       2       2       2       2       1       1       1       3       3       5       8	5	2	2	2	2	2	2	ι	1		ı	3	3	5	8	8	đ	8
2       2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	L	1	L	ī	3	3	ເລ	В	8	8	6
2       2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	ì	1	ı		3	3	5	8	8	8	g
2       2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	٤	2	2	2	Į	ı	1	ı	3	3	5	8	8	a	8
2       2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	ι	l.	ı	ι	3	3	5	8	8	8	8
2       2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	ı	1	1	l	3	m	ភ	8	8	8	8
2       2       2       2       2       2       1       1       1       3       3       5       8       6       8	2	2	2	2	2	2	2	ι	1	1	ιl	3	3	เม	8	8	8	8
2       2       2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	ı	1	L	١	3	3	5	8	ਬ	8	8
2       2       2       2       2       2       2       2       2       2       3       3       3       3       5       8       8       8       8         2       2       2       2       2       2       2       1       1       1       3       3       5       8	2	2	2	2	2	2	2	ţ		ı	į	3	3	5	8	8	Ð	6
2       2       2       2       2       2       1       1       1       3       3       5       8       8       8       8         2       2       2       2       2       2       2       1       1       1       3       3       5       8       8       8       8         2       2       2       2       2       2       1       1       1       3       3       5       8       8       8       8         2       2       2       2       2       2       1       1       1       3       3       5       8 </td <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>١,</td> <td>L</td> <td>ı</td> <td>ι</td> <td>3</td> <td>3</td> <td>5</td> <td>己</td> <td>8</td> <td>ઈ</td> <td>8</td>	2	2	2	2	2	2	2	١,	L	ı	ι	3	3	5	己	8	ઈ	8
2       2       2       2       2       2       1       1       1       3       3       5       8       8       8       8         2       2       2       2       2       2       1       1       1       3       3       5       8       8       8       8       8         2       2       2       2       2       2       1       1       1       3       3       5       8       8       8       8       8         2       2       2       2       2       2       1       1       1       3       3       5       8       8       8       8       8         2       2       2       2       2       2       1       1       1       3       3       5       8	2	5	5	2	2	2	2	ι	ι	Į	L	3	3	5	용	8	B	8
2 2 2 2 2 1 1 1 1 3 3 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	2	2	2	2	2	2	2	ī,			ı	3	3	5	8	8	8	8
2     2     2     2     2     2     1     1     1     3     3     5     8     8     8     8       2     2     2     2     2     2     1     1     1     3     3     5     8     8     8     8       2     2     2     2     2     2     1     1     1     3     3     5     8     8     8     8       2     2     2     2     2     2     1     1     1     3     3     5     8     8     8     8       2     2     2     2     2     2     1     1     1     3     3     5     8     8     8     8	2	2	2	2	2	2	2	ı	1	i	ı	3	3	5	8	8	8	8
2     2     2     2     2     2     1     1     1     3     3     5     8     8     8     8       2     2     2     2     2     2     1     1     1     3     3     5     8     8     8     8       2     2     2     2     2     2     1     1     1     3     3     5     8     8     8       2     2     2     2     2     2     1     1     1     3     3     5     8     8     8     8	2	2	2	2	2	2	2	1	ı	1	ιĪ	3	3	5	8	8	8	8
2 2 2 2 2 2 2 1 1 1 1 3 3 5 6 8 8 8 2 2 2 2 2 2 2 1 1 1 1 3 3 5 8 8 8 8	2	2	2	2	2	2	2	l	1	L	ţ	3	3	5	8	8	8	8
2 2 2 2 2 2 2 11 11 3 3 5 8 8 8 8	2	2.	2	2	2	2	2	Į	1	ı	L	3	3	5	8	8	8	8
	2	2		2	2	2	-	ī		L	1			5	В	8	8	8
	2	2		_	2			Ш	-	-	÷	3			8		8	- 5
<del>▐▄▗▗▔▗</del> ▗▐▗▗▔▗▙▋▞▗▄▄▖▙▗▆▆▋▔▗▎▄▗▙▄▍▗▍▆▍▆▍▗▗▍▗▗▗▐▄▄▄▐▗▃▗▐▗▄▄▗▐▀▆▆▆▆	5	2	2	2	2	2	!	-	-	-	÷		3	· 5	_	8	8	8
2 2 2 2 2 2 1 1 1 3 3 5 8 8 8 8					-	_	-	بت	-	Ξ,		_			_			
2 2 2 2 2 2 2 1 1 1 1 3 3 5 8 8 8 8 8					-	_	_	_	_	1	1	_				_		
2 2 2 2 2 2 2 2 1 1 1 1 3 3 5 8 8 8 8	1 2	121	15	1 2	٢	۲.		į,	LL.	1	1.	3	_3_	, D	ថ	a.	G	a

SPEC 5.1 NIF BULKHEAD SHELL Q 36 SCALE

, 100	2			JO: 1		-		•								
2	2	2	2	_	3	3	2	3	H	-1	0	2	7	10	10	8
					_	_	_	-	H	<del></del>	D	2	7	10	10	8
						_	_	_	-		0	2	7	10	10	8
				_		-	_				0	2	7	10	10	8
				_	-	-			_		0	N.	7	10	ני	8
				_		-	-	-	-	+	0	2	7	10	10	B
			·	-	-	Н	$\vdash$	ы	+		-	2	7		10	8
			_	_				_	_		0	2	7	10	10	8
	<del></del>			$\vdash$	_	-	_	_	+	+	<del></del>		_			-
				_	-	1			-		0	2	7	10	10	8
			· · · · · · · · · · · · · · · · · · ·	-	-	-	Н	Н	+	<del></del>	0	. 2	7	10	10	B
2	<del></del>		_	_	_	-		_	-	_	0	2	7	10	10	6
2	2	5	2	2	3	3	2	3	ᅢ	1	0	2	7	10	10	8
5	2	2	2	2	3	3	2	3	H	-1	0	2	7	10	10	8
2	2	2	2	2	3	3	2	3	H	-1	o	2	7	10	10	8
2	2	2	2	2	3	3	2	3	н	-1	0	ત્ય	7	10	10	8
5	2	2	5	2	3	3	2	3	+	1-1	U	5	7	10	10	8
22	2	2	2	2	3	3	2	3	H	1	0	2	7	10	10	8
2	2	2	2	2	3	3	2	3	H	1-1	0	2	7	10	ιo	8
2	2	2	2	2	3	3	Q	3	ŀ	-1	0	2	7	10	10	8
2	2	2	2	2	3	33	ß	3	H	1-1	0	2	7	10	10	8
2	2	2	2	2	3	3	2	3	Н	1-1	0	2	7	10	10	8
2	2	2	2	2	3	3	2	3	H	-1	0	2	7	10	10	8
2	2	2	2	2	3	3	2	3	H	1-1	0	2	7	10	10	8
2	2	2	2	2	3	3	2	3	Н	1-1	ō	2	7	10	10	8
2	2	2	2	2	3	3	2	3	Н	1-1	0	2	7	10	10	е
2	2	2	2	2	3	3	2	3	H	<u> </u>  1	0	2	7	10	10	8
2	2	2	2	2	3	3	2	3	H	1-1	0	2	7	10	10	8
2	2	2	5	2	3	3	2	3	Н	1-1	Ç	2	7	10	10	8
2	2	2	2	2	3	3	2	3	H	1-1	0	10	7	10	10	8
2	2	2	2	2	3	3	2	3	H	1-1	0	2	7	10	10	8
2	2	5	2	2	3	3	2	3	ŀ	<u>L-1</u>	0	2	7	10	10	8
2	2	2	2	2	3	3	2	-	+		0 -	5	7	10	10	8
2	2	2	2	2	3	3	-	-	H	+	0	2	7	10	10	8
2	5	2	2	2	3	3		•	Н	-	0	2	7	10	10	8
2	2	2	2_	5	3	3	2		H		0	2	17	10	10	8
2	2	2	2	2	3	3	2	3	Н	1-1	0	2	7	10	10	8
2	2	2	2	2	3	3	2	3	H	[ -] [ -]	0	2	7	10	10	8
2	2	2	2	2	3	3	2	-	H	-	0	2	1	10	10	8
<u> </u>	<u></u>			15.	. ~	٠		·~	لت	-1					·	A

SPEC 5.1 NTF BULKHEAD SHELL

Q 36

ORIGINAL PAGE IS OF POOR QUALITY

FIG 65

2

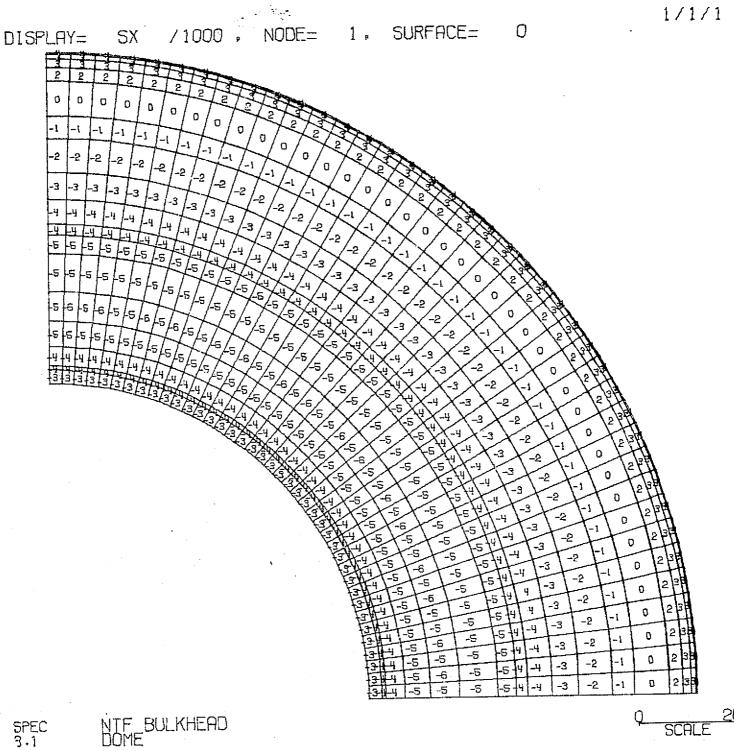
DISPLAY= SY

/1000 . NODE= 1. SURFACE=

2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2 2 2 2		8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	Ø	00000000		2 0 2	4 6 4 6 4 6 4 6 4 6 4 6	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	7 7 7 7 7 7	8 8 8 8 8 8 8 8	വയയയയയയയ	g g g g g g g g	6 6 6	7 7 7 7 7 7
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2		1 1 1 1 1 1	00000000	0000000	000000		9 E 9 E 9 E 9 E	3	7 7 7 7 7 7	8 8 8	១១១១១	9 9 9 9	6 6 6	7 7 7 7
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2	N N N N N N N N N	1 1 1 1 1	00000000	000000			4 E 4 E 4 E	3	7 7 7 7	8 8 8	១១១	9 9 9	5 6 6	7 7 7
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	N N N N N N N	1 1 1 1	0000000	000000	00000	STEE STEELS	1 E	3	7 7 7 7	8 8	១១	න හා භ	6 6	7 7 7
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2	N N N N N N	1 1 1 1	0000	00000	0000		} E	1	7 7 7	ප 8	9	9 0	6 6	7
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2	N N N N N	1 1 1	0 0 0	0000	0 0	2 0 2	1 E		7	8	9	8	6	7
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2	2 2 2	N N N N	1 1 1	0	0 0 0	0	2	<b>1</b> {	1	7		_		<del></del> -	
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2	2 2 2	N N N	1 1	0	0	0	P	-	-4		0.				
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2	2 2 2	2 2	1	o	σ	$\overline{}$	11	*		7	8	9	6	6	7
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2	2 2 2	2	1	•	├	U		3 1	-+	-	8	9	- <sub>6</sub>	6	7
2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2	2	2	<del>-</del>	10		'n		+	-1	-	8	9	6	6	7
2 2 2 2 2 2 2 2 2 2	2	2	_	ı ı		-	₽-	H	-	-						
2 2 2 2 2 2 2 2	2		2	-	a					-1	7	8	9	6	6	7
2 2 2 2 2 2		2		1	0	-		Н		-	7	8	9	6	6	7
2 2	2		2	_	╌		1			-+	7.	8	9	6	Б	7
2 2		2	2	1	0		╆-			-+	7	8	9	6	-6	7
<del>                                     </del>	2	2	2	1	0	0	0	암	1 6	4	7	8	9	Б	6	7
1	2	2	2	į.	0		<u> </u>	Þ			7	8	9	6	6	7
2 2	2	2	2	1	Ю	0	0		ع إذ	1	7	8	9	6	6	7
2 2	2	2	2	1	0	0	0	2	1 6	1	7	8	Ð	6	Б	7
2 2	2	2	2	1	0	0	o	2	1 6	7	7	8	9	æ	æ	7
2 2	2	2	2	l	0	0	0		3 6	П	7	8	9	6	6	7
2 2	2	2	2	1	o	O	0	2	1 6	1	7	8	9	6	6	7
2 2	2	2	2	1	0	O	0	2	1 6	,	7	8	9	6	6	7
2 2	2	2	2	1	o	ø	0	2	1 6	П	7	8	9	6	5	7
2 2	2	2	2	i	C	c	D		∮ €	ī	7	8	9	6	6	7
2 2	2	2	2	ł	0	0	0	2	1 8		7	8	9	6	6	7
2 2	2	2	2	ī	0	o	D		, E	1	7	8	9	6	6	7
2 2	2	5	2	1	0	0	0		3 1	Ì	7	8	5	5	6	7
2 2	2	2	2	1	0	ū	c	2	Į E		7	.0	9	5	6	7
2 2	2	2	2	1	0	0	0		1 6		7	8	9	6	Б	7
2 2	2	2	2	1	O	O	0		1 6	]	7	B	9	6	6	7
2 2	2	2	2	١	0	0	Ü	2	j 6		7	8	9	6	6	フ
2 2	2	г	2	i	0	a	o	2	1 8	╝	7	8	9	6	6	7
2 2	2	2	2	1	O	Ü	Įo	2	<u> 1</u> E		7	8	O.	۵	6	7
2 2	2	2	2	l	ō	_	لبية		1 6	1	7	8 .	9	t)	6	7
2 2	2	2	2	i	-	C	-			-+	7	8	9	Б	6	2
2 2	2	2	2	1	0	0			-		7	-8	.9	6	5	7
2 2	- 5	2	2	1	0	ō	<del>-</del>			-+	-7	8	9	6	6	7
2 2	2 2	2	2	1	0	_	0		<del></del>	-+	7	8 8	9	6	6	7
<u> </u>		5	اکا	1	14:		nil.	1-								

SPEC 5.1 NTF BULKHEAD SHELL

0 36 SCALE



ORIGINAL PAGE IS OF POOR QUALITY

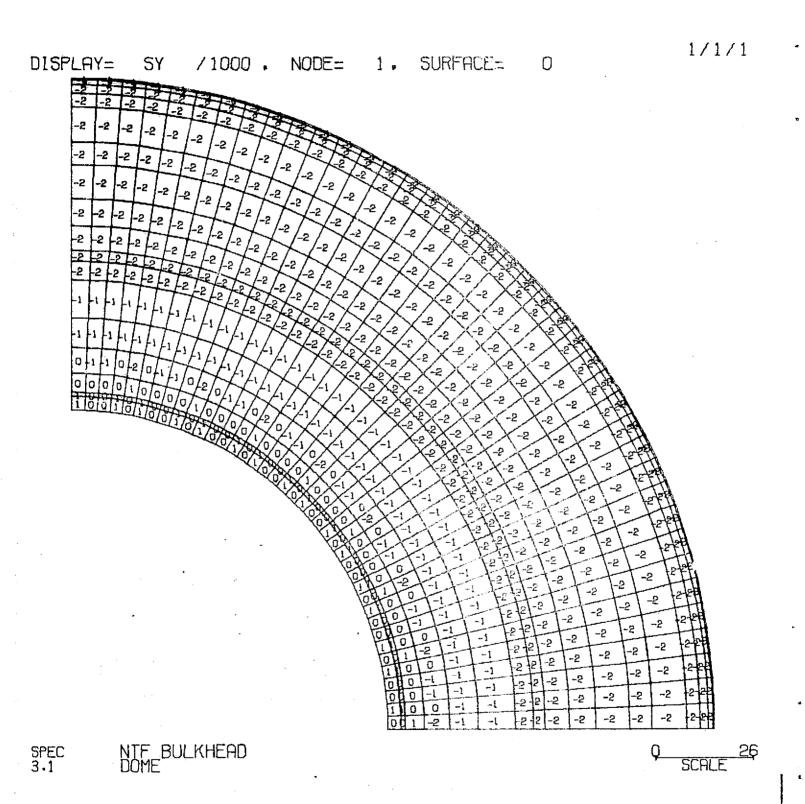
1/1/1

						1		17171
DISPLAY=	SX	/1000 .	NODE=	1 ,	SURFHUE=	1	•	
DISPLAY=  2 2 2  1 1 1  0 0 0  -1 -1 -1  -3 -3 -3  -4 -4 -4 -4  -4 -4 -4  -4 -4 -4  -4 -4 -4  -4 -4 -4  -4 -4 -5 -4  -4 -4 -5 -4  -4 -4 -5 -5  -5 -5 -5 -4	2 2 1 1 0 0 -1 -1 - 3 -3 -3 3 -3 -3 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -1 -5 -5	2 2 2 2 2 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0		2 2 2 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SURFACE=			
5 15 15 14 15	1 7 4 1 3		4 5 5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	-4 -4 -4 -3 -3 -3 -4 -4 -4 -4 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	-1 0 1 3 -1 0 -3 -1 0	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		-19-5 1-0 1	14 14 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	-1 0 1 -1 0 -1 0 3 -1 0 3 -1 0	2 PH 2 PH 1 2 PH
cn=0 ·h		RIN KHEAN		L		_ ,		o <u>26</u> SCALE
SPEC 3.1	JOME	BULKHEAD						

F16 68

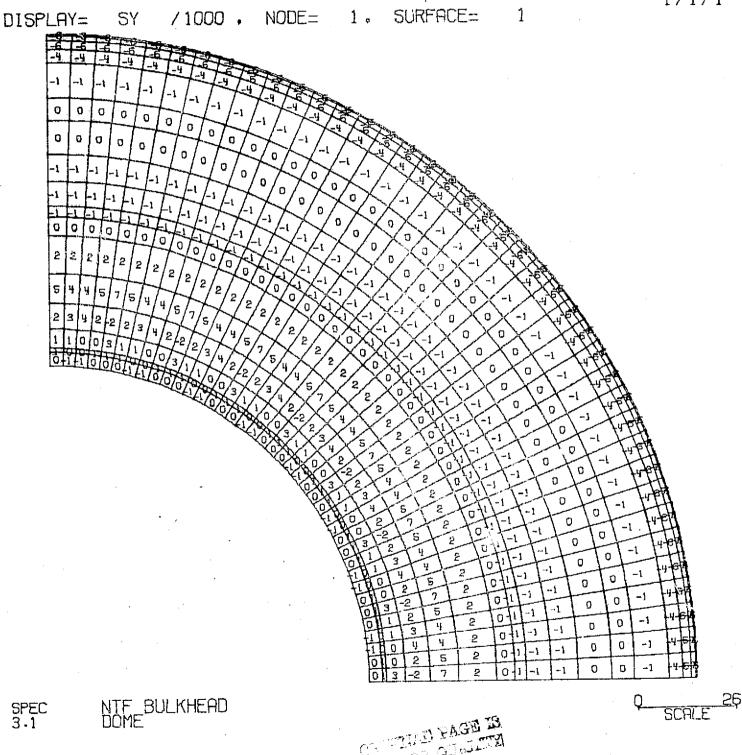
/1000 . NODE= 1 . SURFACE= 2 SX DISPLAY= -2 -3 <del>...</del>6 NTF\_BULKHEAD DOME

OR CONAL PAGE IS



F16.70





F16-71

F16.72

		1	ì	1	T		1	i	1	l	1		L	1	1	1	1	ı	1	1	1	į	1	1	ι	1	l	1	į	i	1	į	1	l	1	ı	1	ı	1	ı	1	3
Ţ		i	-i	-1	Ŧ	١	-1	-1	-1	-1	1	Ŧ	ı	-1	-1	-1	-1	-1	-1	-1	-i	-1	-1	-1	-1	-i	-1	-1	-1	-1	-1	-1	-1	-l	-1	-1	-1	-1	-1	-1	1	-1
Ę	1	-7	4	4	ŀ	4	ц	7	-11	4	-4	L	4	-4	-4	4	-4	4	-4	-4	-4	-14	-14	-4	-3	_ <b>L</b>	ų	-4	-ij	4	-ц	11	-4	11	-4	-14	4	-	4	4	ц.	4

SPEC 10.1 NTF BULKHEAD HATCH OPENING

CONTRACTOR SACRET

) <u>scare</u> 18

3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	Е	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
1	l	-1	-1	-1	-1	-1	-1	Fi	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	- 1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-L	1	-1
4	4	-3	3	-3	ц	4	-3	-3	-3	-4	4	-3	-3	-3	4	-14	-3	-3	-3	-4	-4	-3	-3	-3	-4	-ų	-3	-3	-3	ч_	4	-3	-3	-3	4	-4	3	3	3

SPEC 10.1

NŤF BULKHEAD HATCH OPENING Q 18 SCALE

F16,74

£	1	1	-1	1	Fi	-1	-1	-1	-1	-1	-i	-1	-1	-1	-1	-L	- <u>i</u>	-1	-1	-ı	-1	-1	-L	-1	-1	-1	-1	-1	-1	-l	-1	-1	-1	-Į	1	.1	1,	-Į	1	;
Į	2	2	-2	2	-2	2	-2	-2	-2	-2	2	-2	-2	-2	-2	-2	-2	-2	-2	-2	2	-2	2	-2	-2	-2	-2	-2	2	-2	-2	-2	-2	2	-2	2	-2	Q.	2	2
Į	•	4	4	4	4	-14	-4	-4	-14	4	4	-4	-4	-4	-4	4	-14	-4	-14	-"	11	-4	1,1	-4	4	-4	-4	4	4	-13	4	4	-4	-ų	4	4	-4	1	4	4

SPEC NTF BULKHEAD 10-1 HATCH OPENING Q 18

DISPLAY= SY /1000 . NODE= 1 . SURFACE= 0

o	U	O	0	0	0	0	O	0	0	0	0	0	0	0	0	0	0	o	0	0	0	0	٥	Q	0	a	0	٥	o	0	0	0	O	0	0	0	0	0	0
0	o	0	О	3	0	O	Ö	0	0	0	0	0	0	۵	0	0	0	ប	O	0	0	ô	0	0	0	0	o	0	O	0	0	0	O	O	0	0	0	0	ט
0	0	0	o	o	O	0	0	0	0	0	0	O	٥	ם	O	0	0	o	Ü	0	O	O	0	٥	Ü	0	0	Q	ņ	0	0	O	0	0	0	0	0	0	0

SPEC NTF BULKHEAD 10-1 HATCH OPENING Q 18

F1476

DISPLAY= SY /1000 . MODE= 1 . SURFACE= 1

6	e	6	6	6	6	б	6	6	6	6	6	6	6	6	6	6	5	6	6.	6	6	6	5	6	6	6	៩	8	Ĝ	6	ខ	5	6	Б	6	6	6	6	Б
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	3	3	3	3	3	3	3	3	3	3
0	o	o	О	o	0	0	0	0	0	0	ø	0	0	0	σ	0	0	٥	٥	0	0	0	Q	ŋ	Q.	ū	0	O	0	0	0	٥	О	0	0	o	0	a]	0

SPEC

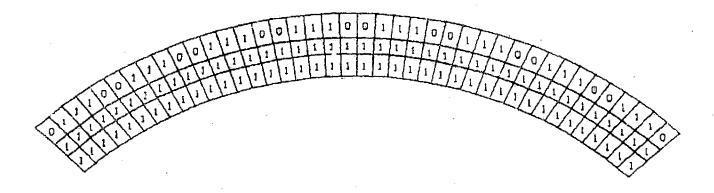
NTF BULKHEAD HATCH OPENING Q 18 SCALE

DISPLAY= SY /1000 , NODE= 1 . SURFACE= 2

5	5	5	5	5	5		5	-5	-5	-5	-5	5	১	-5	-5	-5	-5	-5	-5	-5	-5	-5	5	-5	-5	-5	-5	-5	s	5	-5	5	-5	-5	5	5	-5	-5	5	5
2	2	2	2	F	2	:	2	5	-2	-2	-2	2	-2	z	-2	-2	-2	-2	2	-2	-2	-2	2	-2	-2	2	-2	2	-2	2	2	-2	-2	Q	2	2	2	2.	2	2
0	0	E	-1	ŀ	I	I	0	1	-1	-1	0	0	-1	-1	-1	0	С	-1	-1	Fī	0	o	-1	-1	-1	0	O	-1	-1	-ı	0	0	-1	-1	-1	0	o.	1	1	1

SPEC NTF BULKHEAD 10-1 HATCH DPENING

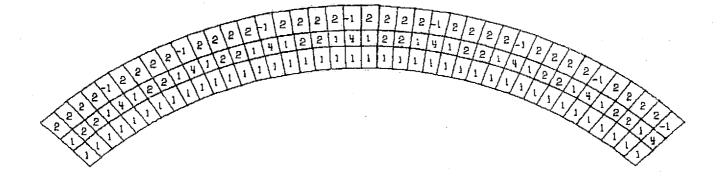
Q 18 SCALE DISPLAY= SX /1000 . NODE= 1 . SURFACE= 0



SPEC 2.1 NTF BULKHEAD FLANGE SURFACE ORIGINAL PAGE IS OF POOR QUALITY

Q 21

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 1

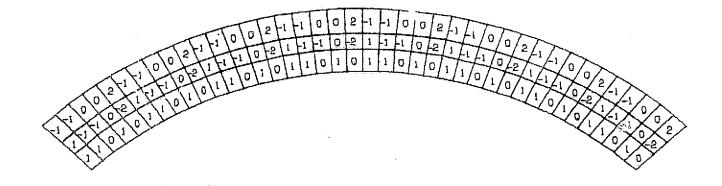


SPEC

NTF BULKHEAD FLANGE SURFACE

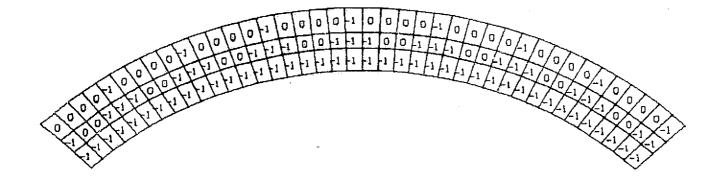
Q SCALE

DISPLAY= SX /1000 . NODE= 1 . SURFACE= 2



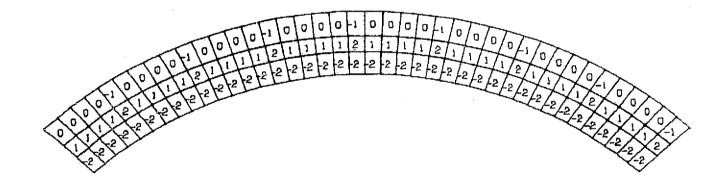
SPEC NTF BULKHEAD 2.1 FLANGE SURFACE Q 21 SCALE 21

DISPLAY= SY /1000 . NODE= 1 . SURFACE= 0



SPEC 2.1 NTF BULKHEAD FLANGE SURFACE

9 21 SCALE DISPLAY= SY /1000 . NODE= 1 . SURFACE= 1

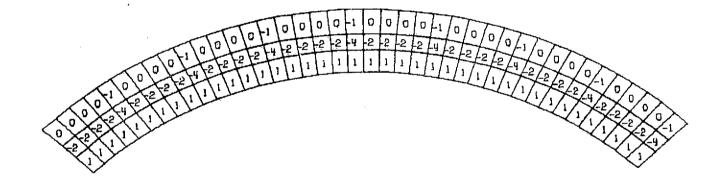


ORIGINAL PAGE IS OF POOR QUALITY

SPEC 2.1 NTF BULKHEAD FLANGE SURFACE

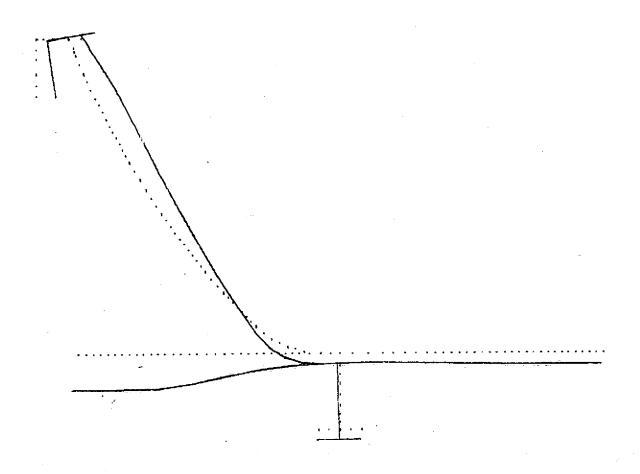
SCALE

DISPLAY= SY /1000 . NODE= 1 . SURFACE= 2



SPEC

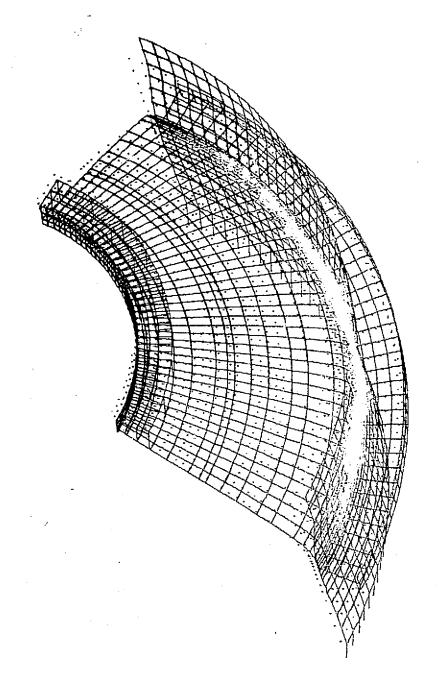
NTF BULKHEAD FLANGE SURFACE Q 21



SPEC 12.1 NTE BULKHEAD CROSS-SECTION VIEW Q 27 SCALE

ORIGINAL PAGE IS
OF POOR QUALITY

F16 85



SPEC

NȚ<u>E BULKH</u>LAD

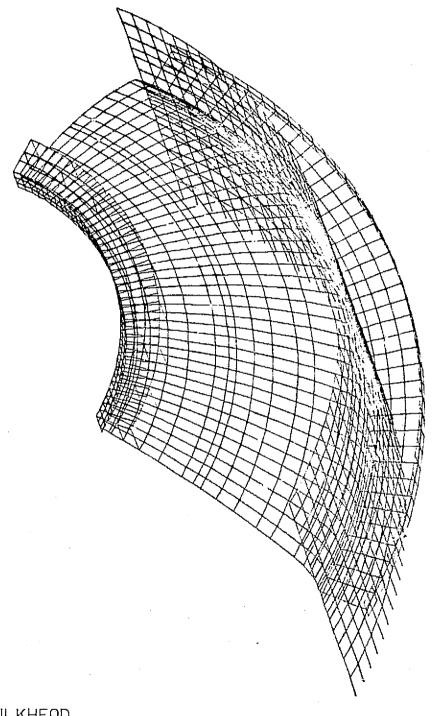
Q 44 SCALE

## CASE 3

FULL PRESSURE STRESS PLOTS

FIGURES 87 THRU 113

COMPUTER RUN NO. AAU



SPEC 1.1

NTF BULKHEAD

O SCALE

FIG. 87

DISPLAY= SX /1000 . NODE=

1.

SURFACE=

$\sim$
1-1
$\mathbf{U}$

10	10	10	3	8	7	6	5	4	1	4 4	4	6	11	13	15	16
10	10	10	9	8	7	6	5	-	걤	#:	4	6	11	13	15	16
10	10	10	9	8	7	6	5	4	4	_	4	6	11	13	15	16
10	10	10	9	8	1		-	•	1	-	4	6	11	13	15	16
10	10	10	3	8	7	6	5	•		-	4	6	11	13	15	15
10	10	10	9	8	7	6	5	-	h	<del></del>	14	6	11	13	15	16
10	10	10	9	8	7	6	5	4	ī	1 4	4	6	11	13	15	16
10	10	LO	9	8	7	6	5	4	H	1 4	4	6	11	13	15	16
10	10	10	9	В	7	6	5	4	ij	1 4	4	6	11	13	15	16
10	10	10	9	8	7	6	5	4		1 4	ų	6	11	13	15	15
10	10	10	9	В	7	6	5	4	7	4 4	ų	6	11	13	15	16
10	10	10	9	8	7	6	5	4	1	1 4	11	6	11	13	15	16
10	10	10	9	8	7	6	5	4	4	1 4	ų	6	11	13	15	16
10	10	LO.	9	8	7	ទ	5	4	4	1 4	4	6	11	13	15	16
10	10	10	9	8	7	6	5	ų	1	1 4	4	5	11	13	15	16
10	10	10	3	8	7	G	5	4	ų,	1 4	4	6	11	13	15	16
01	10	10	3	8	7	6	5	ц	4	1 4	4	6	11	13	15	16
10	10	10	9	8	7	6	5	ч	4	4	4	Б	11	13	15	16
10	10	Į Q	9	8	7	8	5	4	4	4	ų	6	11	13	15	16
10	10	10	9	8	7	6	5	4	4	ц	ц	6	11	13	15	16
10	10	10	9	ខ	7	6	5	ч	4	1 4	4	6	11	13	15	16
10	10	10	9	8	7	6	5	4	4	14	4	6	11	13	15	15
10	10	10	9	8	7	Б	5	ų	4	4	ч	6	11	13	15	16
10	10	10	е	8	7	6	5	ų	41	ī ij	.4	6	11	13	15	16
10	10	LO.	9	В	7	Б	5	4	4	4	4	6	11	13	15	15
10	10	10	9	8	7	6	5	4	4	1 4	ч	8	11	13	15	16
10	10	10	9	8	7	6	5	4	ij.	14	4	6	11	13	15	16
10	10	10	9	8	7	â	5	4	4	1 4	4	6	11	13	15	16
10	10	10	9	8	7	6	5	4	1	4	4	6	11	13	15	16
10	10	10	9	В	7	6	5	4	4	1 4	4	6	11	13	15	16
10	10	ιo	3	8	7	6	5	4	43	4	4	6	11	13	15	16
10	10	10	9	8	7	ε	5	ų	4	4	4	6	11	13	15	16
10	10	10	9	В	7	Б		-	11	+	4	6	11	13	15	16
10	10	10	9	8	7	6	5		<u>' 1</u>	<del>) -</del>	4	6	11	13	15	15
10	10	10	9	8	7	6	5		4 ]	4		6	11	13	15	16
10	10	10	9	8	7	6	5	-	44	+	4	6	11	13	15	16
10	10	10	9	8	7	6		-	1): 1):	+	4	6	11	13	15 15	16
10	10	10	9	8	7		5	$\boldsymbol{-}$			4	6	11	13	15	16

NTF BULKHEAD

ORIGINAL PAGE IS
OF POOR QUALITY

DESPLAY= SX /1000 , NGDE=

SURF

F	A	C	E	=	1
		_			_

_																
10	$\prod a$	10	9	В	7	6		5	55	1	2	5	10	14	16	16
10	12	10	9	8	7	6	5	5	_	1	2	5	10	14	16	1.6
10	10	10	9	8	7	8			55	1	2	5	10	14	15	16
10	10	10	9	8	7	•	_	-	55	1	2	5	10	14	15	16
10	10	10	9	5	7	6	_	5	_	1	2	5	10	14	16	16
10	10	10	9	8	7	5	-	-	55	1	5	5	10	14	16	16
10	10	10	9	8	7	6	٠.		55	1	2	5	10	11/2	16	16
10	10	10	9	8	7	6	-	_	55	1	2	5	10	14	16	16
10	10	10	9	8	7	8		5	55	1	5	5	10	14	16	16
10	10	10	3	8	7	6	_	_	50	_	. 2	5	10	14	16	16
10	10	10	9	8	7	â		-	55	_	2	5	10	14	16	16
10	10	10	9	8	7	+-		-	55	1	S	5	10	14	15	16
10	1.0	10	9	8	7	6	5	5	55	1	2	5	10	14	15	16
10	to	10	9	8	7	6	5	5	รธ	1	2	5	10	14	16	16
10	10	10	9	8	7	5	5	5	SS	1	2	5	10	14	16	16
10	10	10	9	8	7	8	5	5	55	1	5	5	10	14	16	16
10	10	10	9	8	7	6	5	S	55	J	υ,	5	10	14	16	16
10	10	16	9	8	7	6	5	5	55	1	2	5	10	14	16	16
10	10	10	9	8	7	6	5	5	55	1	2	5	10	14	16	16
1.0	10	10	9	8	7	6	5	5	55	1	2	5	10	14	16	19
10	10	10	9	₿	7	6	5	5	ธร	1	2	Б	10	14	16	16
10	10	10	9	8	7	Ŀ	5	5	35	1	2	5	10	14	16	16
10	10	10	9	8	7	s	5	ទ	ទីទី	i	2	5	10	14	16	16
10	10	10	9	8	7	S	5	5	รร	ı	2	5	10	14	16	16
10	10	10	9	8	7	6	5	5	55	i	2	5	10	14	16	16
10	LO	10	9	8	7	6	5	5	55	1	S	5	10	14	16	16
10	10	10	9	8	7	6	5	5	55	1	2	ន	10	14	16	16
10	10	10	9	8	7	6	5	5	รร	1	8	5	10	14	16	16
. 10	10	10	9	8	7	5	5	5	55		2	5	10	14	15	16
10	10	10	9	8	7	6	5	5	55	1	2	5	10	14	16	16
10	10	10	9	8	7				รธ	1	2	5	10	14	1.6	16
10	10	10	9	8	7	8	5	ទ	55	ı	2	5	10	14	15	16
10	10	10	9	8	7	8	5	5	55	1	2	5	10	14	16	16
10	10	10	9	8	7	Б	5	5	55	1	2	S	10	14	16	16
10	10	10	9	В	7	5			55	1	2	5	<u>10</u>	14	16	16
10	10	10	9	8	7	T-7-	5		55	1	.2	5	10	14	16	16
10	10	10	9	8	7	5	5	-	55	1	2	5	10	14	16	16
10	10	10	9	8	7	5			55	<u>l</u>	2	5	10	! 4	.6	16
10	10	10	9	8	7	6	5	5	9 5	1	2	5	10	14 14	16	16
[· ][	10	l lu	1 -3	10	. /	10	Į.	ا لا ا	(A)	1 4	۱ -	י ו	I IU	L± T		L . U

SPEC 5.1

NTF BULKHEAD SHELL

SCALE

ORIGINAL PAGE IS OF POOR QUALITY

DIS	SPLA	Υ=	SX
-----	------	----	----

(	/1 <b>0</b> 0	0 ,	N	ODE	==			1		ş	,	SUR	FAC	CE:		2		
	10	10	10	10	9	7	S			35		6	В	11	12	15	16	1
	10	10	10	10	9	7	5	4	3	33	7	6	B	11	12	15	16	
	10	10	10	10	9	7	5	4	3	33	7	6	8	11	12	15	16	
	10	10	10	10	9	7	5	ų	3	33	7	6	8	11	12	15	16	
	10	10	10	10	9	7	ទ	ч	3	3 3	7	5	8	11	12	15	16	
	10	10	10	10	9	7	5	ч	3	33	7	Б	8	11	12	15	16	ĺ
	10	10	1.0	10	9	7	5	4	3	33	7	6	8	11	12	15	16	
	10	10	10	LΩ	3	7	5	4	3	33	7	6	8	11	12	15	16	
	10	10	LO	10	69	7	5	ų	3	33	7	6	8	11	12	15	16	!
	10	10	ΙO	10	9	7	5	ų	3	33	7	6	В	11	12	15	16	
	10	10	10	10	9	7	5	' <u>‡</u>	3	33	7	5	8	11	12	15	16	
	10	10	10	LO	9	7	5	4	Э	33	7	6	8	11	12	15	16	
	10	10	10	10	9	7	5	4	3	33	7	6	8	11	12	15	16	
	10	10	10	10	9	7	5	ij	3	33	7	ទ	8	11	12	15	16	ĺ
	10	10	10	10	9	7	S	4	3	33	7	6	8	11	12	LS	16	
	10	10	10	10	9	7	5	ų	3	33	7	6	8	11	12	15	l6	ĺ
	10	10	10	10	9	7	5	4	Э	33	7	5	Ð	11	12	15	16	
	10	10	10	10	9	7	5	ц	3	33	7	6	8	11	12	1,5	16	
	10	10	10	Į Ü	9	7	5	4	3	33	7	6	В	11	12	15	16	

7 5

7 5 4 3 33 7 ίÖ 7 5 4 3 3 3 7 7 5 4 3 33 7 7 5 4 3 7 5 4 3 5 4 3 33 7 5 4 3 3 3 7 10 9 

4 3 3 3 7

5 4 3 33

7 5 4 3 33 7

7 5 4 3 33 7

5 4 3 33 7

7 5 4 3 3 3 7 7 5 4 3 3 3 7 7 5 10 S 7 S 4 3 3 7 10 S 7 S 4 3 3 7 11 12 10 9 7 5 4 3 3 7 10 9 7 5 4 3 3 7 11 12 ₿ 11 12 

SPEC 5.1

NTF BULKHEAD SHELL

1.0

LO

ĮŪ

DISPLAY=	SY	/1000 .	NODE=	1.	SURFACE=	0

<b>5</b>																
	5	5	5	5	5	4	Э	_	3		3	5	В	8	5	19
	5_5	5	5	5	5	14	3	3	3	+	3_	5_	8	8_	8	8
<u>5</u>	5	5	5	5	S L	4	3	-	3	-	3	5	8	8	8	8
<u>5</u>	5	5	5	5	<b>5</b>	4	n n	드		1.	3	5 5	8	8	- 8 - 8	8
5	5	5	5	5	5	ų	-	н	313	+	3	5	8		<u>, в</u>	8
	5 -	5	5	5	5	ų	-	_	3		3	5	В	8	8	8
5	5	5	5	5	5	4	3		33	<del>, ,</del>	3	5	8	8	8	В
<del>_</del> 5	5	5	5	5	S	4	3	-	33	<del>-</del>	3	5	В	8	8	8
5	5	5	5	5	5	4	3	3	35	3	3	5	В	8	8	8
5	5	5	5	5	5	4			1		3	5	8	8	В	8
5	5	5	5	5	5	ц	3	3	33	3 3	3	5	В	8	8	8
<del>_</del>	5	5	5	5	S	4	Į		33	_	3	5	В	8	8	8
5	5	5	5	5	5	4	3	-	35	+	3	5	Θ	8	В	8
5	5	5	5	5	5	4	3	Э	3 3	3	3	5	8	8	8	8
5	5	5	5	5	5	4	3	3	3	3	3	5	В	8	8	В
5	5	5	5	5	5	4	3	3		3	3	5	8	В	В	8
5	5	5	5	5	ธ	4	3	3	3	3	3	5	8	В	8	8
5	5	5	5	5	5	4	3	3	33	3	Э	5	В	8	8	Ħ
5	5	5	5	5	5	4	3	3	3	3	3	5	В	8	. 8	ម
5	5	5	5	5	5	4	Э	3	33	3	3	5	В	Ð	8	8
5	5	5	5	5	5	ų	3	3	3	3	3	5	8	8	8	8
5	5	6	5	5	5	ч	3	3	3 3	3	3	5	В	8	В	8
5	S	5	5	5	5	4	3	Э	33	3	3	5	8	8	8	8
5	5	5	S	5	5	ų	3	3	33	3	3	5	8	8	8	8
5	5	5	5	5	5	4	3	3	33	3 3	3	5	B	8	15	8
5-	5	5	5	5	5	ų.	3	3	33	3	3	5	8	8	8	8
5	5	5	5	5	5	4	3	Э	3	3	3	5	в	8	8	8
5	5	5	5	5	5	4	3	Э	3	3	3	5	8	В	8	8
5	5	5	5	5	5	ų	3	3	3	3	3	5	8	8	В	8
5	5	5	5	Б	5	ų	3	_	33		Э	5	8	8	8	8
3	5	5	5	5	5	4	3	3	3	3	3	5	8	8	8	8
5	5	5	5	5	5	ų	3	-	3		3	5	8	8	8	8
S	5	5	5	5	5	ų	3		33		3	5	8	8	8	8
_ 5	5	5	S	5	5	4		-	햐	-	3_	5	8	8	-8	8
5_	5	5	5	5	5	4	-	-	3	+	. 3	5	8	. 6	8	8
5	5	5	5	5	5	4	3		33	<del>; -</del>	3	5	В	8	8	8
<u>5</u> 5	5	5 5	5	5	5	4	3	+	33	- <del></del>	3	5	8	8	8	8
5	5	5	5	5	5	4	3	_	3		3	5	8	8	8	8
	<del></del>		4 <u></u>				_			·	-	<del></del>				

SPEC 5.1

NTF BULKHEAD

0 36 SCALE

ORIGINAL PAGE IS OF POOR QUALITY

DISPLAY= SY /1000 , NODE= 1 , SURFACE= 1

100	. ,	1.44					. 1	•	7		•	3011	1 110	- بيا د			
5	5	ч	3	4	5	6		7			-6	-3	Û	7	10	10	. 8
5	5	4	3_	4	5	6	6	7	-	7	-6	-3	0	7	10	10	_ 8
5	5	4	3	4	5	6	•	-	н	-+	-6	-3	0	7	10	10	8
<u>5</u>	5	ц ц	3	4	5	6	6	7	7	4	-6 -6	_ფ _ფ	G G	7	10 10	10	8
5	5	4	3	ц	5	6	├	7	Н	-+		-3	0	7	10	10	8
5	5	4	3	ų.	5	6	-	<del>,</del>	H	-	-6	-3	0	7	10	10	8
5	5	4	3	4	5	╄	6	•	H	+	-6	-3	0	7	10	10	8
5	5	ц	3	ч	5	6	┼	+	7	~÷	-6	-3	0	7	10	10	8
5	5	4	3	ч	5	6	6	7	7	7	-6	-3	0	7	10	10	8
5	5	4	. 3	4	5	6	6	7	7	7	-6	-3	Q	7	10	10	8
5	5	4	3	ų	5	6	6	7	7	7	-6	-3	0	7	10	10	8
5	5	Ч	3	4	5	6	6	7	7	7	-6	-3	0	7	10	10	8
5	5	ч	3	ч	5	6	6	7	7	7	-6	-3	0	7	10	10	8
.5	5	ч	3	4	5	6	õ	7	7	7	6	- <b>3</b>	O	7	10	10	8
5	5	ij	3	Ц	5	6	6	7	7	7	-6	-3	0	7	10	10	8
5	5	ų	3	,£	5	6	6	7	7	7	-6	,	O	7	10	10	8
5	5	ц	3	4	5	6	8	7	7	7	-6	-3	0	7	10	10	8
5	5	· ų	3	ų	5	6	6	7	7	7	-6	-3	Ð	7	10	10	8
5	5	4	3	4	5	6	6	7	7	7	Ð,	ڻ ل	0	7	10	10	8
б	5	ч	3	4	5	6	6	7	7	7	-6	3	0	7	10	10	8
5	5	ч	3	4	5	6	6	7	7	7	-6	-3	0	7	10	10	В
6	5	ч	3	ц	ច	6	6	7	7	7	-6	-3	0	7	10	10	6
5	5	Ч	3	ų	5	6	6	7	7	7	-6	-3	Ω.	7	10	10.	8
5	5	Ч	3	4	5	а	6	7	7	7	-6	-3	Û	7	10	10	8
5	5	4	Э	4	5	6	5	7	7	7	-6	-3	0	7	10	10	8
5	5 _	ų	3	ų	5	6	6	7	7	7	-6	3	Û	7	10	10	8
5	5	ij	3	4	5	6	6	7	7	7	-6	<b>-3</b> .	0	7	10	10	8
5	5	<b>1</b>	3	4	5	6	6	7	7	7	-6	-3	0	7	10	10	8
5	5	ч	3	ų	5	8	6	7	7	7	-6	3	0	7	10	10	8
5	5	4	3	4	5	6	6	7		7	-6	-3	Ū	7	10	LO	8
5	5	4	3	4	5	Б	5	7		2	-6	-3	0	7	10	10	8
5	5	ų	3	4	5	6	6	7		7	-6	-3	0	7	10	10	- 8
S	5	Ч	3	ч	5	6	6	7	2	7	-6	-3	0	7	10	10	8
5	5	4	3	ų.	5	8	6	ļ	7	-	-5	-3	0	7.	10	1:0	8
5	5	Ч	3	4	5	6	+÷	+	7	-	-6	-3	0	7	10	10	8
5	5	Ч.	3	4	5	Č	6	+	7	2	-6	-3	0	7	10	10	- 8
5	5	ц ц	3	4	5	6	6	7	7	7	-6 -6	-3 -3	0	7	10	10	8
5		<del>                                     </del>	3	1	12	무	문	7	띩	4	_0_			<del>                                     </del>	10	10	0.

NTF BULKHEAD

DISPLAY=

SY

/1000 .

NODE=

1.

SURFACE=

	2		
٠			
5		т	
3		ı	

5	5	6	7	6	5	2	1	Ö	o!	0 13	9	1	9	8	5	5	7
5	5	6	7	6	5	2	ī	<u> </u>		01:	<del>-</del>	_	9	8	5	5	7
5	5	6	7	8	S	2	ı	٥	þ:	1:	9		9	8	5	5	7
5	5	6	7	Б	5	2	Ţ	a	Į,	0 ! :	9	1	9	8	5	5	7
5	S	6	7	6	5	2	1	0		01:	3 3		9	8	S	5	7
- 5	5	δ	7	6	5	2	1	0	o.	0 13	9		9	В	5	5	7
5	5	6	7	6	5	2	1	0	þ	0 13	9	_	9	8	S	5	7
5	5	6	7	6	5	2	1	0		0 13	3 5		9	В	5	5	7
6	5	6	7	6	5	5	1	0	0	0 13	3 9		9	8	5	5	7
5	5	6	7	6	5	2	1	0	b)	0 13	9		3	8	5	5	7
8	5	6	7	6	5	2	1	0		0 13	9	i	9	8	5	5	7
5	5	6	7	Б	5	2	1	a		13	3 3		9	В	5	5	7
5	ទ	6	7	6	5	5	1	û		13	9	١	9	В	5	5	7
5	5	6	7	6	5	2	1	o	o	0 13	9		9	8	5	5	7
5	S	6	7	Б	5	2	1	O		0 1.3	3 9	l .	9	8	5	5	7
5	5	6	7	6	5	2	1	٥	o	0 13	9	1	9	8	5	Б	7
5	5	6	7	6	5	2	1	0	p	0 13	3	1	9	8	5	Б	7
8	5	6	7	6	5	2	1	0	O	0 13	3 9	١.	9	8	5	6	7
5	5	6	7	б	5	2	1	0	þ.	0 1 3	3 9	1	9	В	5	5	7
5	. 5.	8	7	6	5	2	1	0	þ	0 13	3 9	1	9	В	5	5	7
5	5	6	7	6	5	2	1	0	o.	13	3 5	1	9	8	5	5	7
5	5	8	7	6	5	2	1	a	o,	0 13	<u>9</u>	· _	9	8	5	5	7
5	5	6	7	6	5	2	1	٥	9	1:	3 9	1	9	8	5	5	7
5	5	6	7	6	5	2	1	0	)	Q 13	3 3	1	9	8	5	6	7
5	ន	6	7	6	5	2	1	0	þ	0 13	3 9	1	9	8	5	5	7
5	5	6	7	6	5	2	1	Q	o i	0 1.3	3 9		9	В	5	5	7
5 _	5	6	7	6	5	2	1	o	o.	0 13	9	1	9	8	5	5	7
5	5	6	7	6	5	2	-4	0	Ö,	0 13	9	1	9	8	5	5	7
- 5	\$	6	7	6	5	2	1	0	p.	0 13	9	t	9	8	5	5	7
5	5	6	7	6	5	2	1	0	ρį	0 1.3	3 9	1	9	8	5	5	7
5	5	6	7	6	5	2	1	0	0	0 13	3		9	В	5	5	7
5	5	6	7	6	5	2	1	0	2	0 13	9	1	9	В	5	5	7
5	5	6	7	6	5	2	1	Q		_	9		9	В	5	5	7
5	5	6	7	6	5	2	1	0	þ	<u> </u>	9	!	9	В	5	5	7
5	5	6	7	6	5	2	1				-		9	В	5	5	7
5	5	6	7	6	5	2	1			3 13			9	8	5	5	7
5	5	6	7	6	5	2	1	-	н	0 13	_	_	9	8	5	5	7
5	5	6	7	6	5	2	1	-	_	0 13			9	В	5	5	7
5 5	5 5	6	7	6	5	2	1	_	_	0 L3	_		9	В В	<u>5</u>	<b>5</b>	7
<u> </u>	<u> </u>	6		ᆫ	<u></u>	ے	ᄔ	0	ᄖ	<u>) L3</u>	_	_		ا ب	<u> </u>		

SPEC 5.1

NTF BULKHEAD SHELL

DISPLAY= SX	/1000 , NODE=	1. SURFACE=	0	1/1/1
2 2 2 3				
0 0 0 0				
0 0 0 0 0				
0 0 0 0				
0 0 0 0 0 0				
0 0 0 0 0 0			1	
0000000				
			0 0 0	
			0 0 12	
			0 0 1	
•			00000	TH
			(C) 10 10 10 10 10 10 10 10 10 10 10 10 10	0 1 2
		010000000	101	0 1 2
		010000	000000000000000000000000000000000000000	0 1 24
		0000000	000000	1
				1-1-1
SPEC NTF_BL	ULKHEAD			0

3.1

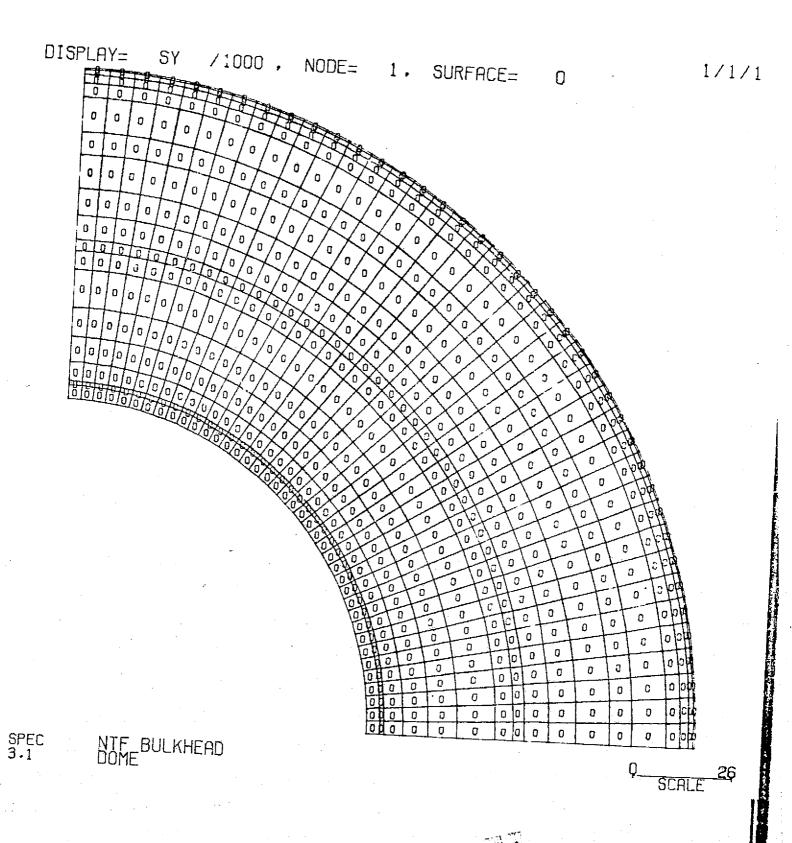
NTF BULKHEAD DOME Q 26 SCALE

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
SPEC 3.1 DOME    OD 0	

OF FOUR QUALITY

DISPLAY= SX	/1000 , N	VODE=	1.	SURFACE=	2	1/1/	1
		√ ¹/a / `		$\langle \rangle \langle \rangle$			
	<b>₹</b> /º/₀/ト⊀ //						
	~		000000000000000000000000000000000000000	0 00			
				701	00000	0 0 0 1 15 0 0 0 1 15 0 0 0 1 15 0 0 0 1 15	
SPEC NTF BUL 3.1 DOME	KHEAD					QSCALE	26

F1G.96



F16 97

DISPLAY= SY /1000	. NODE=	1, SURFACE=	1	1/1/1
SPEC NTF BULKHEAD				Q 26 SCALE

F1598

DISPLAY=	SY	/1000 .	NODE=	1.	SURFACE	= 2			-
									·
-1 -1 - -1 -1 -1	+								
0 0 0	0 0 0		$\begin{bmatrix} -1 & -1 & -1 \\ -1 & -1 & -1 \\ 0 & 0 & -1 \end{bmatrix}$	-1 -1 -1 -1	-1 -1				
0 0 0	1100				1 -1 -1 -1 1 -1 -1 -1 -1 -1 -1 -1 -1 -1	-1 -1 -1			
0 0 0 0		1 7 0/n /			(0)	-1 -1 -1 -1 -1 -1 -1 -1 -1			
	10101018							1 1 2 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	•	<u>.</u>				2000	-1 -1	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	
			Ó		0000	0000	0 -1	1-1 -1	
			· .	間	0 0 0	0 0 0		-1 -1 -1 -1 -1 -1 -1 -1 -1	
SPEC	NTF_BU DOME	LKHEAD	<u>.</u>	0	0 0 0	0 0 0	<del>_</del>	_1	SCALE
3.1	UUME								

F1699

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 0

0	0	O	0	0	0	0	D	q	0	0	ß	0	0	0	٥	O	0	٥	0	0	O	٥	0	0	Ð	a	٥	0	0	۵	O	0	a	Ó	0	0	0	٥	
0	0	o	0	٥	0	٥	ø	0	0	0	0	٥	٥	0	0	0	0	0	0	O	0	0	Q	0	0	a	0	0	C	0	0	С	0	0	0	0	0	0	0
0	O	O	D	Q	a	0	0	0	0	a	Q	0	0	٥	0	0	۵	0	0	0	0	0	٥	O	٥	0	۵	0	0	٥	٥	ø	O	ū	0	O	٥	C	0

SPEC 10.1 NTF BULKHEAD HATCH OPENING Q 18

DISPLAY= SX /1000 . NODE= 1 . SURFACE= 1

0	0	0	0	0	0	0	0	0	0	0	0	0	o	0	0	0	Q	0	a	0	0	0	0	0	٥	a:	0	0	٥	ū	0	۵	0	0	G	c	С	8	c!
0	0	o	o	٥	0	o	0	ū	0	0	٥	0	0	0	0	Ð	٥	٥	0	0	0	0	0	0	0	0	O	0	0	0	0	C	σ	σ	0	0	c	0	ם
0	0	0	0	0	0	0	0	0	Q	0	٥	0	0	0	O	0	٥	0	0	٥	0	0	0	٥	٥	0	۵	0	٥	0	0	0	O	0	0	Ð	3	ε:	Ū

SPEC 10.1 NTF BULKHEAD HATCH OPENING

Q 18 SCALE

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 2

a	0	0	0	0	a	0	D	a	0	۵	0	0	٥	0	0	0	0	٥	0	0	0	0	0	0	ŋ	0	٥	٥	0	0	0	0	Q	0	Đ	0	0	3	b
0	0	o	o	٥	0	0	0	0	Ç	0	σ	0	0	o	O	0	0	Ø	0	0	٥	Đ	0	0	0	a	Ø	0	0	0	O	0	0	Q	۵	0	c	3	0
0	o	0	o	1 -	0	"	٥	0	0	٥	0	0	0	0	0	٥	0	0	٥	0	0	0	0	Q	٥	0	0	0	Ç	0	٥	0	Ω	0	0	0	٥	3	٥

0.1

NTF BULKHEAD HATCH OPENING 8<u>1</u> SCALE 0

F16 102

DISPLAY= SY /1000 . NODE= 1. SURFACE= 0

0	0	0	0	(	2	0	0	0	٥	0	٥	0	0	0	g	0	0	0	0	8	0	0	0	0	٥	0	٥	0	0	٥	Q	Ç	0	0	C	O	٥	С	0	0
0	0	0	0	Ç	) (	0	0	0	0	0	0	٥	a	o i	0	0	0	٥	ŋ	0	0	0	0	0	0	0	¢	0	0	٥	0	0	D	0	O	С	c		2	0
0	0	0	٥	Į	) [	3 <u> </u>	0	0	0	0	0	0	a	O	Ω	0	0	0	٥	0	0	0	٥	0	۵	O	Û	O	0	О	0	Ø	0	٥	ε	0	0	3	0	e

SPEC NTF BULKHEAD 0.1 HATCH OPENING

Q SCALE

DISPLAY= SY /1000 , NODE= 1 , SURFACE= 1

0	0	C	,	0	0	0	0	0	0	0	٥	0	a	0	0	0	D	0	0	0	0	0	0	0	0	0	0	0	0	٥	D	0	ß	O	Đ	٥	D	0	9 0
0	0	0		0	0	0	0	O	0	0	0	٥	0	0	O	σ	O	0	0	¢	0	0	0	0	ø	9	Đ	o	0	0	O	0	O	O.	0	0	0	0	0 0
0	<u>o</u>	0	ı	0	٥	0	٥	0	0	0	0	0	0	٥	O	0	0	٥	٥	O	٥	a	0	0	Ū	٥	0	٥	0	٥	C	٥	O	O	0	ŋ	ŋ	0	o 2

SPEC NTF BULKHEAD 10-1 HATCH OPENING ) 18 SCALE

F16 104

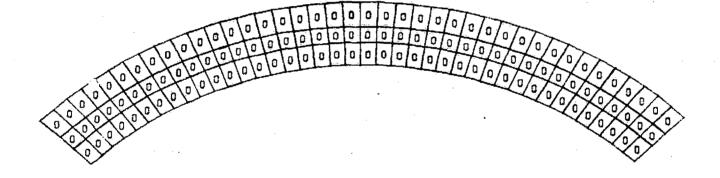
DISPLAY= SY /1000 , NODE= 1 . SURFACE= 2

0	0	o	0	0	0	0	0	٥	٥	a	0	Đ	0	0	a	0	٥	0	0	0	0	0	0	٥	¢	٥	0	0	0	0	0	ວ	٥	0	0	Ū	0	3	إو
0	O	Q	0	0	0	0	c	0	0	o	0	0	o	0	0	0	q	O	٥		1			i i	Ι.	0	1 1	1	0									i	
0	0	0	٥	0	0	0	0	0	O	o	o	0	0	٥	O	0	0	g.	O	C	0	٥	0	0	O	Ö	0	0	0	0	٥	0	0	0	O	0	c	e	2

SPEC NTF BULKHÉAD 10.1 HATCH OPENING O 18 SCALE

ORIGINAL PAGE IS OF POOR QUALITY

DISPLAY= SX /1000 , NODE= 1 , SURFACE= C



SPEC :

NTF BULKHEAD FLANGE SURFACE Q 21 SCALE

F16106

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 1

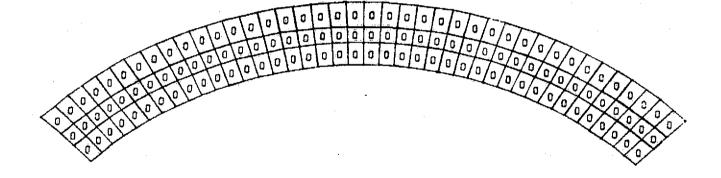
1/1/1

000000000000000000000000000000000000000		0/0/0
000000000000000000000000000000000000000	10/0/0/0/0/0	

SPEC 2.1 NTF BULKHEAD FLANGE SURFACE

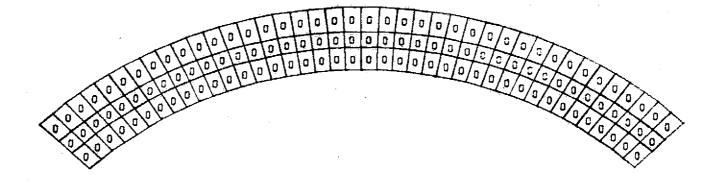
O SCALE

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 2



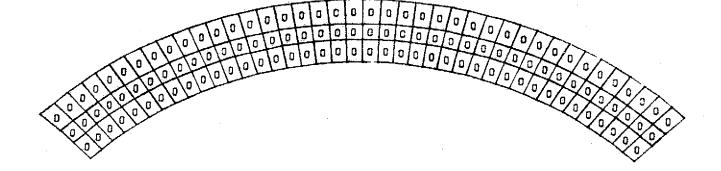
SPEC NTF BULKHEAD 2.1 FLANGE SURFACE

Q 21 SCALE DISPLAY= SY /1000 , NODE= 1 . SURFACE= C



SPEC NTF BULKHEAD 2.1 FLANGE SURFACE 0 <u>SCALE</u> 21

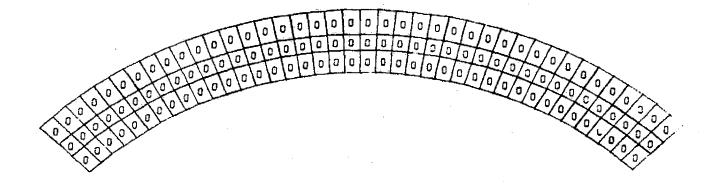
DISPLAY= SY /1000 , NCDE= 1 , SURFACE= 1



SPEC 2.1 NTF BULKHEAD FLANGE SURFACE 0 200 2

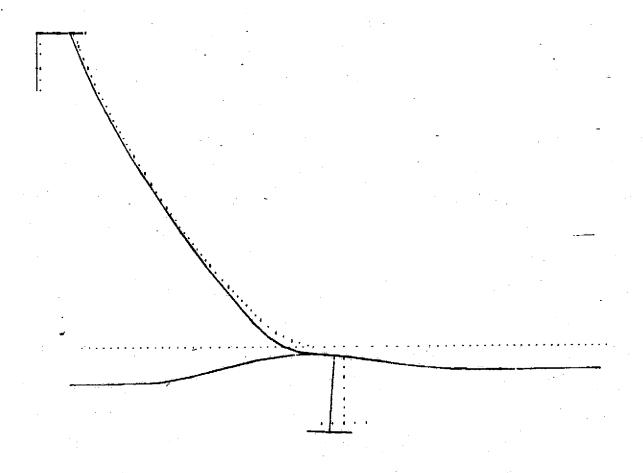
F16 110

DISPLAY= SY /1000 , NODE= 1 , SURFACE= 2



ORIGINAL PAGE IS OF POOR QUALITY

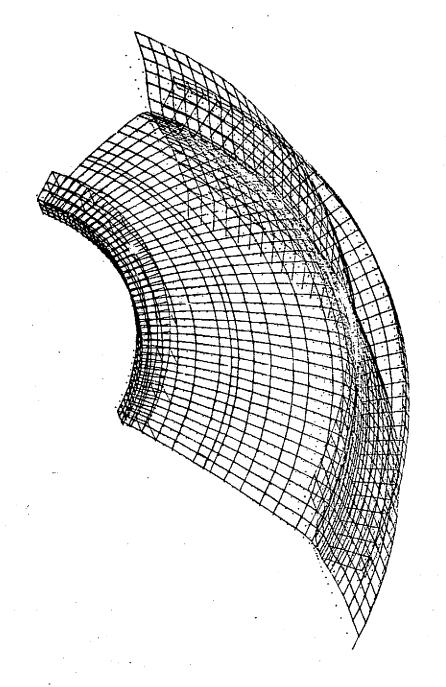
SPEC NTF BULKHEAD 2.1 FLANGE SURFACE Q\_\_\_\_\_21



SPEC 12-1 NTF BULKHEAD CROSS-SECTION VIEW

O SCALE

F16 112



SPEC 1

NTF BULKHEAD

O 44 SCALE

## CASE 4

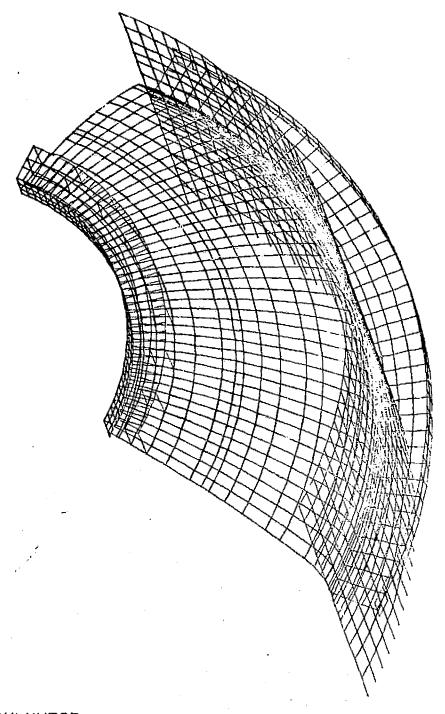
GATE UALUE OPEN

WI STEADY STATE TEMP. PROFILE.

STRESS PLOTS

FIGURES 114 THRU 140

COMPUTER RUN NO. LAD



SPEC NTE BULKHFAD

Q YI

DISPLAY= SX

/1000 . NODE= 1. SURFACE=

6	5	6	6	8	7	Б	ų	3	1	3	3	-4	-1	В	7	12	18
5	5	6	ó	8	7	Б	4	3	1	3	3	14	-7	8	7	12	18
5	5	6	В	8	7	8	4	3	1	3	3	<u>-4</u>	-1	8	7	15	18
5	5	6	6	В	7	6		•	-	3	3	4	-1	8	7	12	18
5	5	6	6	8	7	-		3	-	3	3	-4	-1	8	7	12	18
5	5	6	6	Ħ	7.	6	۰-	3	Н	3	3	<u>-</u>	-1	13	7	12	18
5	5	6_	6	8	7	6	<del>-</del>		Ц	+	3	-1]	-1	8	7	12	18
5	5	6	6	8	7	6				3	3	'	-1	8	7	12	18
5	5	6	6	8	7	6	<b>├</b>	3	Н	4	3	- <u>Li</u>	-1	В	7	12	ъB
5	5	6	6	В	7		4	-	1		3	<b>-</b> 4	-1	8	7	12	18
5	5	6	6	8	7	8	ų,	3	1	3	3	-17	-1	8	7	12	18
5	5	6	6	8	7	6	4	3	1	3	3	-4	-1	8	7	12	18
- 5	5	6	6	8	7	6	4	3	1	3	3	<u>t</u>	-1	В	7	15	18
5	5	6	6	8	7	6	4	3	1	э	3	<u>1</u>	-1	В	7	12	18
5	5	6	6	8	7	6	ų	3	1	3	3	-1	-1	8	7	12	18
5	5	- 6	8	8	7	6	4	3	1	3	3	-년	i	G	7	15	18
5	5	6	6	8	7	6	4	3	1	3	Э	<b>!</b>	-1	8	7	12	18
5	5	6	6	8	7	8	ц	3		3	3	_t <u>t</u>	-1	8	7	12	18
5	5	6	6	8	7	6	11	э	1	3	3	U	-1_	8	7	12	18
Б	Б	6	G	8	7	6	ų	3	1	3	3	1 <u>1</u>	-i	В	7	12	18
5	-5	6	6	8	7	6	ц	3	1	3	3	-4	-1	В	7	12	18
5	5	6	6	8	7	6	ų	3	1	3	Э	-4	1	В	7	12	18
Б	6	G	6	8	7	S	ű	3	1	3	3	-4	1	6	7	12	18
. 6	5	6	8	Ð	7	67	¥	Э	ı	3	3	-11	-1	8	7	12	18
ទ	5	G	6	8	7	6	ıī	3	1	3	3	_կ	-1	В	7	12	18
5	5	S	6	8	7	G.	ų	3		3	3	-4	-1	8	7	12	18
25	5	6	G	В	7	6	ų	3	1	5	3	-4	1	8	7	12	18
5	-5	6	6	8	7	6	ıŢ	3	1	9	3	-4	-1	8	7.	12	81
5	5	6	6	8	7	6	ų	3	1	3	3	-1]	1	0	7	12	19
5	ទ	6	G	8	7	6	ij	3	1	3	3	-11	-1	6	7	12	13
5	ទ	6	6	8	7	6	u	a	1	3	3	-1	- 1	8	7	12	18
б	5	в	6	8	7	6	ů,	ä	1	3	3	-4	-1	В	7	12	18
5	5	6	6	Ð	7	õ	ű	3	1	3	3	_U	-1	В	7	12	18
5	6	G	6	8	7	ô	11	3		3	3	11	-1	0	7	12	18
5	5	6	6	ถ	7	n	•	3	1	-	3	-41	1	8	7	15	16
5	5	6	6	8	7		<u>[11</u>		_	2	3_	-4	-1	8	7	12	18
5	5	6	5	8	7	5		3		3	3	1 <u>1</u>	-1	8	7	12	18
1 6	15	6	6	ß	7	6	ij	ز. ا			3		-1	8	7	12	18
5			_	7	i o i	10			4.	~ 1	200	í ti	1 4				
<u>6</u>	5	6	6	0	7	6		3.  9		3	3	-4	<del>-1</del>	8	$\frac{7}{7}$	12	18 18

SPEC 5.1

NTF BULKHEAD SHELL

DISPLAY= SX

/1000 , NODE= 1 , SURFACE= 1

<b>5</b>	5	6	6	7	5	4	2	n.	2	-8	-12	-6	7	9	14	18
5	5	6	6	7	5	4	2	Ü	2	-8	-12	-6	7	9	14	18
Б	5	8	6	7	5	4	-	ō,	20	-8	-12	-6	7	9	14	18
5	5	6	6	7	5	4				-8	-12	-6	7	9	14	18
Б	8	6	6	7	5	4		0			-12	-6	7	9	14	18
- 5	5	6	6	7	5	4	2	머	3/2	-8	-12	-6	7	9	14	18
- 5	5	В	6	7	5	4	S	0	2	-8	-12	-6	7	9	14	18
5	5	6	6	7	5	4		_	_	-6	-12	-6	7	9	14	18
6	5	_6	6	7	5	4	2	마	20	-8	-12	-6	7	9	14	18
- 5	5	8	6	7	5	11	2	9	Z D	-0	-12	-6	7	9	14	18
5	5	В	6	7	5	4	2	아	20	-8	-12	6	7	9	14	18
5	5	6	6	7	5	4	2	0	20	Ð	-12	-6	7	9	14	18
δ	5	6	8	7	5	4	2	0	20	-8	-12	-6	7	3	14	18
5	5	6	6	7	5	4	2	0	20	-8	12	-6	7	9	14	18
5	5	6	6	7	5	4	2	0	20	-8	-12	-6	7	9	14	18
6	5	6	6	7	6	4	2	0	20	-8	-12	-6	7	9	14	18
5	6	6	6	7	5	4	s	0	20	-8	-12	-6	7	9	14	18
8	5	В	8	7	5	ч	2	O,	20	-8	-12	-6	7	9	14	18
5	5	6	в	7	5	4	5	G.	20	-8	-12	-6	7	9	14	18
Б	5	-6	6	7	5	4	2	0	2	-8	-12	-6_	7	9	14	18
5	8	6	в	7	5	ų	2	0	20	-8	-12	6	7	3	. ų	18
5	5	6	6	7	ឆ	4	2	G-	20	-8	-12	-6	7	9	14	18
5	Б	6	8	7	5	4	2	0	20	-8	-12	6	7	9	14	18
6	5	6	6	7	S	'i	2	0	20	-8	-12	-6	7	9	14	18
5	5	6	6	7	5	ų	2	o.	2 0	-8	-12	-6	7	9	14	18
5	5	6	6	7	5	ų	2	G	20	-8	-12	-6	7	9	14	18
5	ъ	8	8	7	5	4	2	G-	20	-8	-12	-6	7	9	14	18
5	5	6 .	6	7	5	4	2	0	2 0	-8	-12	6	7	9	1,4	18
5	5	6	6	7	ន	4	2	0	20	-8	-12	-6	7	9	14	18
6′	6	6	6	7	5	4	2	0	20	-8	-12	-6	7	9	14	18
6	6	6	6	7	5	ų	2	o	20	-8	-12	-6	7	3	14	18
6	5	в	В	7	5	ч	5	G.	20	-В	-12	-8	7	5	14	18
Б	5	6	8	7	5	4	-	_	_	-8	-12	~6	7	9	14	18
. 6	5	В	6	7	5	4		G			-12	-6	7	3	14	18
5	5	6	6	7	5	4		0			-12	-6	7	9	14	18
5	5	6	6	7	5	4		머			-12	<u>-6</u>	7	9	14	18
5	- 5	6	6	7	5	4		P			-15	·-6	7	9	14	18
- 5	5	6	6	7	5	4				-8	~12 -12	-6	7	9	14	1B 13
<u> 5</u>	5 5	6	6	7	5	4		0		-8 -8	-12	-6 -6	7	9	14	18
			<u> </u>	<u>ب</u> ــا	٠,	13	5	14.)	-1-	Ι		1 70			1 1	

SPEC 5.1 NIF BULKHEAD

) 36 SCRIF



DISPLAY= SX

/100C .

NODE=

1. SURFACE=

$\mathbf{a}$

					,				_		,			,	· · · · · ·	
5	5	<u>_6</u> _	7	9	10	_	7	$\rightarrow$	1	+	3	4	10	4	9	19
<u>5</u>	5	<u>6</u>	7	9	10	8	7	6	1	15	3	ų	10	4	9	19 19
5	5	5	7	9	10	8	7	5		4	3	4	10	4	9	19
5	5	6	7	3	10	8	7		i		3	4	10	4	9	19
5	5	6	7	9	•	9	7	-	1 5	_	3	4	10	4	9	19
5	5	6	7	9	10	8	7	+	1 5	-	3	14	10	Ч	9	19
5	5	6	7	9	10	В	7	5	-4-	+	3	11	10	4	9	19
5	5	6	7	9	10	8	7	3	-1-		3	4	10	4	9	19
5	5	6	7	9	10	8	7	8	1 5	15	3	ų	10	ч	9	19
5	5	8	7	9	10	8	7	6	15	15	3	ų	10	ч	9	19
5	5	6	7	9	10	8	7	6	1	15	3	ц	10	¥	9	19
6	Б	6	7	9	10	8	7	5	Ιä	1.5	3	ч	10	4	9	19
Ę	5	6	7	9	10	Ð	7	6	: 3	15	3	ñ	10	ų	9	19
5	5,	6	7	9	10	8	7	5)	į	15	Э	ц	10	ч	9	19
E.	6	6	7	ទ	10	ខ	7	5	İ	15	3	ч	10	4	9	19
5	6	6	7	9	10	ខ	7	ទ	! 5	15	3	ų	10	4	9	19
5	5	6	7	9	10	១	7	6	ij	15	3	ų	10	q	5	19
5	5	6	7	9	10	ខ	7	5	15	15	3	4	10	ц	3	19
5	Б	6	7	3	10	8	7	5	1 5	15	3	ч	ſΩ	ıł	9	19
5	б	6	7	3	19	3	7	0	!6	15	'n	ų	10	ų	9	19
5	5	6	7	9	10	១	7	s	: 3	15	3	4	18	ч	9	19
5	5	6	7	9	10	G	7	3	1	15	3	ц	10	ц	9	19
б	5	6	?	9	fû	ម	7	5	1   5	15	3	4	10	4	9	13
8	5	6	7	9	10	8	7	6	į	15	3	ıI.	10	ų	2	19
5	5	6	7	3	10	ខ	7	5		15	3	Ą	10	4	9	19
Б	5	Ð	7	3	10	8	7	n	1	15	3	ų	11,	ц	9	19
5	- 5	6	7	Ç	10	8	'7	3	tl.;	15	3	ų	10	ц	9	19
5	5	6	7	9	ιŪ	n	7	6	, I ,	5	3	ų	10	ц	9	19
5	5	6	7	9	10	8	7	3	ľ	2.15	3	ч	10	ij	3	19
5	5	6	7	9	:0	9	7	G	T	1.5	3	4	10	11	9	19
5	5	6	7	\$	TO	3	7	ii	15	1.5	3	ų	10	11	9	19
5	5	6	7	9		3	7	ŭ	: <u> </u> :	15	Э.	ц	10	Ч	9	19
б	5	6	7	9	10	ŋ	7	1		15	3	11	10	t <u>ı</u>	9	19
5	6	6	7	9	10		2	<u>e</u> ļ	: 1:	15	3	4	10	4	9	19
5	5	6_	7	9	_	2	-	-		15	3	14	10	4	9	15
5	5	- 6	7	5 (3	10	-		- 1			3	15	10	4	9	19
5	5	6	7	9		ឡ	7	5		15	3	ų ų	10	4	9	19
5 5	- <b>5</b>	6	7	8	بت	8	_		; :	15	3	<u>'!</u> '4	10 10	<u> 4</u>	9	19
_ 0	0	0	/	لتخا	[7:0]	<u>C</u>	4	2.	· IT	1501		7	<u>. o</u>	1-11-	ا ا	13

SPEC 5.1

NTF BULKHEAD SHELL

0 36 SCALE DISPLAY= SY

/100	0 ,	N	ODE	=	:		1		,		-	SUR	FA	E:	= '	0	
2	2	2	2	2	2	2	ī	1	1	1	3	3	5	В	8	В	8
2	2	5	2	2	2	2	1	1	1	1	3	3	5	В	8	8	8
2	2	2	2	2	2	2	1	-	1		3	3	5	В	8	8	8
2	2	2	2	2	2	2	1	1	1	-	3	3	5	8	8	8	8
5	2	2	2	2	5	2	1	1	1	-	3	3	5	8	8	8_	8
2	2	2	2	2	2	2	1	-	1	-	3	3	5	8	8	6	8
2	2	2	2	2	2	2	1	1	1	-	3	3	5	8	8	8	8
2	2	5	2	2	2	2		1	1	+	3	3	<u>ទ</u>	8	8	8	8
2	2	2	2	2	2	2	ŀ	Н	1	+	3	3	5	8	8	8	8
2	2	2	2	2	2	2	-	1	1	+	3	3	5	В	8	8	8
2	2	2	2	2	2	2	i	Н	1	+	3	3	5	8	8	8	8
2	2	5	2	2	2	2		-	1	-	3	3	5	В	D	8	8
2	2	5	2	2	2	2	1	-	1	4	3	3	5	В	8	В	8
2	2	2	2	2	2	2	ī	-	1	-	3	3	5	8	8	8	8
5	2	2	2	2	2	2	1		1	-+	3	3	5	В	0	8	8
2	3	2	2	2	5	2	1	1	1	1	3	3	5	8	8	8	8
2	2	1	2	2	2	S	1	1	1	ī	3	3	5	8	8	6	В
2	2	2	5	2	2	2	ĩ	1	1	ı	3	3	5	8	8	Θ	В
2	2	2	2	2	2	2	1	1	1	ı	3	3	5	₿	8	В	8
2	2	2	2	2	2	5	1	1	1	į	3	3	5	В	8	8	8
2	2	5	ω	5	22	2	1	1	1	ı	3	3	5	8	8	8	8
2	2	2	5	2	S	2	1	1	1	ı	3	3	8	8	8	В	8
2	2	2	2	2	2	2	ı	1	1	1	3	3	5	8	8	8	8
2	5	2	2	2	2	2	1	1	1	니	3	3	5	8	8	8	ម
2	2	2	2	2	2	2	1	1	1	1	3	3	5	8	8	8	8
2	5	5	5	2	2	2	1	1	1	1	3	3	5	В	8	8	8
2	2	2	2	2	2.	2	1	1	1	듸	3	3	5	В	8	8	8
5	2_	2	2	2	2	2	1	1	1	4	3	. 3	5	В	8	8	9
2	5	2	5	2	2	3	1		1		3	3	5	8	8	8	8
2	5	2	2	2	5	2	1		1	_	3	3	5	ខ	8	8	8
2	2	2	2	2	2	2	1	1	1	1	9	3	5	θ	8	8	8
2	2	2	2	2	2	2	ı	1	1	1	3	3	5	8	В	8	8
2	2	5	2	2	2	5	1	1	1	ij	3	3	5	8	8	ß	8
_2_	2	2	2	2	2	2	1	-	-	L	3	3	5	Ð	В	8	8
2	2	2	2	2	2	2	1	1	н	Ц	3	3	5	8	8	- 8	8
2	2	2	2	2	2	2	1	1	7	1	3	3	.5	8	8	8	В
2	5	2	2	2	2	2	1	1		4	3	3	5	8	8	8	8
2	2	2	્ય ૧	2	2	SIS	1	-	1	<u>i</u>	3	3	5	8	8	8	8

SPEC 5.1

NTF BULKHEAD SHELL

SCALE

DISPLAY= SY /1000 , NODE= 1 , SURFACE= 1

2	7 7 7 7 7 7 7 7 7
2   3   3   1   2   6   6   6   6   6   6   6   6   6	7 7 7 7 7 7 7
2 3 3 1 -2 -6 -6 -6 -6 -8 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -8 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -8 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -8 -10 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -10 -25 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -10 -25 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -10 -25 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -10 -25 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -10 -25 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -10 -25 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -10 -25 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -10 -25 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -10 -25 -25 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -10 -25 -25 -25 -25 -25 -25 -25 -25 -25 -25	7 7 7 7 7 7
2 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 3 1 2 6 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	7 7 7 7 7
2 3 3 1 -2 -6 -6 -6 -6 -8 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -2 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -1 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -8 -3 -3 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2	7 7 7 7
2 3 3 1 2 5 6 6 6 6 8 3 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 2 1 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 2 1 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 2 1 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	7 7 7
2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	7 7 7
2 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 3 8 6 21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 3 1 2 6 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 3 1 2 6 6 8 8 8 8 8 8 -21 -12 2 16 17 2 3 3 3 1 2 6 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	7
2 3 3 1 2 6 6 6 6 8 3 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 3 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 3 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17	7
2 3 3 1 2 6 6 6 6 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 6 21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	
2 3 3 1 2 6 6 6 8 3 8 3 6 21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 3 8 36 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 3 8 36 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 3 8 36 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 3 8 36 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 3 8 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 8 6 -21 -12 2 16 17 2 3 3 1 2 6 6 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	7_
2 3 3 1 -2 -6 -6 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -6 -23 -23 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -6 -6 -23 -23 -21 -12 2 16 17	
2 3 3 1 -2 -6 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -6 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -21 -2 2 16 17 2 3 3 1 -2 -6 -6 -6 -21 -2 2 16 17	7
2 3 3 1 -2 -5 -5 -5 -5 -21 -12 2 15 17 2 3 3 1 -2 -5 -5 -6 -6 -3 25 -21 -12 2 16 17 2 3 3 1 -2 -5 -5 -6 -6 -3 25 36 -21 -12 2 16 17 2 3 3 1 -2 -5 -6 -6 -3 25 36 -21 -12 2 16 17 2 3 3 1 -2 -5 -6 -6 -3 25 36 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -3 25 36 -21 -12 2 16 17 2 3 3 1 -2 -6 -6 -6 -3 25 36 -21 -12 2 16 17 2 3 3 1 -2 -5 -6 -6 -3 25 36 -21 -12 2 16 17 2 3 3 1 -2 -5 -6 -6 -3 25 36 -21 -12 2 16 17 2 3 3 1 -2 -5 -6 -6 -3 25 25 25 -21 -12 2 16 17 2 3 3 1 -2 -5 -6 -6 -3 25 25 25 25 25 25 25 25 25 25 25 25 25	7
2       3       3       1       -2       -5       -6       -6       -21       -12       2       16       17         2       3       3       1       -2       -6       -6       -6       -6       -21       -12       2       16       17         2       3       3       1       -2       -6       -6       -6       -8       -8       -21       -12       2       16       17         2       3       3       1       -2       -6       -6       -6       -8       -8       -8       -21       -12       2       16       17         2       3       3       1       -2       -6       -6       -6       -8       -8       -8       -8       -8       -8       -8       -12       -12       2       16       17         2       3       3       1       -2       -6       -6       -8       -8       -8       -8       -8       -8       -8       -8       -8       -8       -8       -8       -12       -12       2       16       17         2       3       3       1       -2       <	7
2     3     3     1     2     6 <th>7</th>	7
2     3     3     1     2     5     6     6     9     3     36     -21     -12     2     16     17       2     3     3     1     -2     -6     6     6     6     8     9     36     -21     -12     2     16     17       2     3     3     1     -2     6     6     6     9     9     36     -21     -12     2     16     17       2     3     3     1     -2     5     6     6     8     9     36     -21     -12     2     16     17       2     3     3     1     -2     5     6     6     8     9     36     -21     -12     2     16     17       2     3     3     1     -2     5     6     6     8     9     36     -21     -12     2     16     17       2     3     3     1     -2     6     6     6     9     9     36     -21     -12     2     16     17       2     3     3     1     -2     6     7     6     6     6     6     6	7
2       3       3       1       -2       -6       6       6       6       9       36       -21       -12       2       16       17         2       3       3       1       2       6       6       6       9       9       9       -21       -12       2       16       17         2       3       3       1       2       5       6       6       8       9       9       6       -21       -12       2       16       17         2       3       3       1       -2       -5       6       6       8       9       9       6       -21       -12       2       16       17         2       3       3       1       -2       -6       6       6       6       9       9       9       -21       -12       2       16       17         2       3       3       1       -2       -6       6       6       6       6       6       6       6       6       6       6       6       7       17       12       2       16       17         2       3       3       1 <th>7</th>	7
2 3 3 1 2 6 6 6 8 9 2 3 5 2 1 -12 2 16 17 2 3 3 1 2 5 6 6 6 8 9 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 9 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 9 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 6 3 2 3 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 6 3 2 3 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 6 2 3 2 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 6 6 8 9 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 6 8 9 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 9 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 9 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 9 2 3 6 -21 -12 2 16 17 2 3 3 1 2 6 6 6 6 8 9 2 3 6 -21 -12 2 16 17	7
2     3     3     1     2     5     6     6     8     8     8     9     6     17       2     3     3     1     2     5     6     6     8     8     9     6     21     -12     2     15     17       2     3     3     1     2     6     7 <t< th=""><th>7</th></t<>	7
2 3 3 1 2 5 5 5 5 5 3 2 3 5 2 1 - 12 2 15 17 2 3 3 1 2 5 5 5 5 5 5 3 3 5 2 1 - 12 2 15 17 2 3 3 1 2 5 5 5 5 5 5 3 3 6 2 1 - 12 2 15 17 2 3 3 1 2 5 5 5 5 5 5 3 3 6 2 1 - 12 2 15 17 2 3 3 1 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	7
2     3     3     1     2     6     7 <th>7</th>	7
2     3     3     1     2     5     6     7     7     2     2     1     2     2     1     1     7     2     2     1     2     1     2     1     2     1     2     1     2     1     2     1     1     2     1     2     1     2     1     1     2 <th>7</th>	7
2     3     3     1     2     3     1     2     3     1     2     3     1     2     3     1     2     3     2     3     3     1     2     3     3     1     2     3     3     1     2     3     3     1     2     3     3     1     2     3     3     1     2     3     4     4     3     4 <th>7</th>	7
2     3     3     1     2     3     1     2     3     1     2     3     1     2     3     2     2     15     17       2     3     3     1     2     3     2     3     1     2     3     1     2     3     1     4<	7
2 3 3 1 2 3 6 7 7 2 1 -12 2 16 17 2 3 3 1 -2 3 6 6 7 7 2 3 3 1 -2 3 6 6 7 7 2 3 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	7
2 3 3 1 2 5 4 7 4 2 21 -12 2 16 17	7
	7
	7
2 3 3 1 1 3 5 7 6 7 3 3 - 12 12 16 17	7
2 3 3 1 - 18 20 21 -50 2 16 17	1
2 3 3 1 2 5 2 6 21 -12 2 16 17	7
2 3 3 1 2 6 6 6 6 16 -21 -12 2 16 17	7
2 3 3 1 -2 -6 6-6 8 8 8 6 -21 -12 2 16 17 2 3 3 1 -2 -6 5 6 6 5 8 2 6 -21 -12 2 16 17	7
2 3 3 1 2 6 5 6 6 7 2 3 6 - 21 - 12 2 16 17	7
2 3 3 1 1-2-6-65-65-335-21 -12 2 16 17	7
2 3 3 1 -2 -6 -6 -5 -7 3 3 6 -21 -12 2 16 17	7
2 3 3 1 1 12 15 15 15 15 25 21 12 2 15 17	7
2 3 3 1 2 8 3 6 9 3 3 5 -21 -12 2 16 17	7
2 3 3 1 -2 -7 -7 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9	7
P 3 3 1 1 12 13 45 6 9 2 35 21 -12 12 16 17	7

SPEC 5.1 NTF BULKHEAD SHELL

ORIGINAL PAGE IS OF POOR QUALITY O SCALE

·						-
ntsplav-	SV	/1000	NODE-	1	SURFACE=	2
DIOI LIN-	O i	/ 1000	MODE	1 7	001/11/06-	<u>~</u>
,						

100	· •	14	UDI		•		1	*	1	יוטט	и п	٠ ــا ٠	-	2	
2	1	2	3	6	10		9	1.1	¢42	28	21	13	-1_	~2	8
2		2	3	6.	10	9	อ	1	<b>1</b> 412	28	21	13	-1	-2	8
2	1	2	3	6		-	9	1	142	28	21	13	-1	-2	8
2	1	2	3	6	10	9	9	4	<u>Ç12</u>	28	21	13	-1	-2	8
2	1	2	3	6	-	3	9	! #	142	28	21	13	-1	-2	8
2	1	2	3	6	10	Н		-	042	28	21	13	-1	-2	8
2	1	2	3	6	10	9	-		142	58	21	13	-1	-5	-8
2	1	2	3	6	FO.	-	-	1	-	28	21	13	-1	-2	8
2	_1_	2	3	6		9	9	-	¢12	28	21	13	-1	-2	8
2	1	2	3	6	_		$\overline{}$	_	CH5	28	51	13	-1	-2	8
2	1	S	3	6	10	3	9	1	642	28	21	13	-1	-2	В
2	1	2	3	6	10	9	3	1	642	28	51	13	-1	-2	8
2	1	5	3	6	10	9	9	1	<b>d</b> 42	58	21	13	-1	2	8
2	7	2	3	6	10	9	9	1	112	28	21	13	-1	-2	8
2	1	2	3	6	10	٥	9	1	645	28	21	13	-1	-2	B
5	1	2	3	6	10	9	9	11	345	20	21	13	-1	-2	8
2	1	2	3	6	10	១	9	1	642	28	21	13	-1	-2	8
2	i	2	3	6	f D	9	9	1	012	28	21	13	-1	-2	8
2	1	2	3	6	10	9	9		642	28	21	13	-1	-2	8
2	1	2	3	6	10	9	9	1,	G12	28	21	13	-1	-2	8
2	1	2	3	6	10	9	9	1	1212	28	21	13	-1	-2	8
2	1	2	3	6	1.0	9	3	1	(42	28	21	13	-1	-2	8
2	i	S	3	6	10	9	9	1	¢.15	28	21	13	1	-2	8
S	1	2	3	6	10	9	3	1	\$12	28	21	13	-1	-2	8
2	1	2	3	6	10	S	9	i i	1,48	28	21	13	-i	-2	8
2	1	2	3	6	10	9	9	1	6.15	28	21	13	-1	-2	8
2	1 _	5	3	Ð	10	9	១	1	412	28	SI	1.3	-1	-2	8
2	i	2	3	6	ťΒ	9	9	1	4.16	23	21	13	-1	-2	8
2	1	2	3	6	10	93	S	. 1	412	28	Sī	13	-1	-5	В
2	i	5	3	6	10	9	3	1		29	21	13	-1	-2	8
2	ı	2	3	ş	10	9	9	ij	445	28	21	13	-1	-2	8
2	1	2	3	G	10	9	5	. 1		23	21	13	-1	-2	8
2	1	2	3	6	10	9	9	t	¢12	28	21	13	-1	-2	19
2	1	2	3	6	10	9	9		¢42	28	21	13	-1	-5	8
2	1	2	3	6	10	5	3	1	14.15	28	51	13	1	-2	8
2	1	2	3	6	10	9	9	Ū	0.15	୧୫	51	13	-1	-2	6
2	1	_2	3	ច	10		9	1	1 12	១១	21	13	-1	~2	<u>B</u>
5	1	8	3	G	LO.		9		<u>  615</u>	20	51	13	-1	-2	8
<u>2</u>	1	-2	3	6	10			11		58	21	13	-1	-2	8
5	_1	2	3_	6	[10]	빌	51	. 11	1642	53	21	[13	<u>-1</u>	-2:	8

SPEC 5-1

NTF BULKHEAD

0 36 SCALE.

/1000 , NODE= 1 , SURFACE= DISPLAY= SX 5

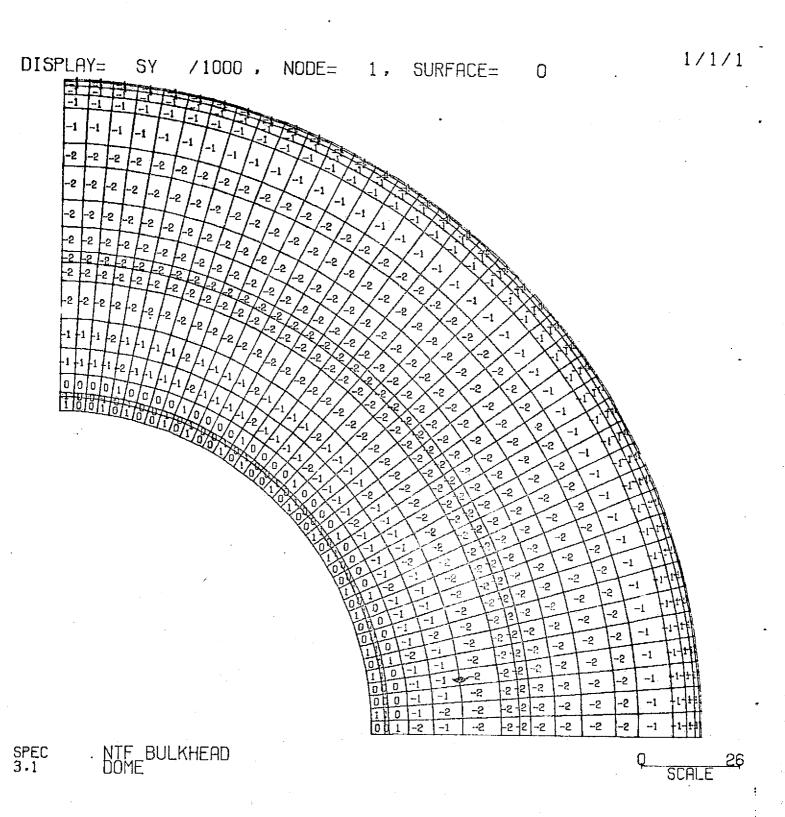
ORIGINAL PAGE IS OF POOR QUALITY

DISPLAY:	= SX	/1700 .	NODL=	1,	SURFACE=	1		1/1/1
13 1	3 13 13							
3 3	1-1-1	1340			•			
7 7	777	$\frac{3}{3}$	737373	13 Tra				
5 5	5 5 5	5 5 7 7	$\frac{3}{1}$					
4 4	4 4 4 4	5/5/5	5 7 7	3/3/	3 13 3			
2 2	2 2 2 2	2 2 2	5/5/	$\langle 1 \rangle_{1}$	3 3 3 3 3			
-1 -1	4	1 1 2 2	2 2 4 4	5 5 5	$\sqrt[7]{3}$			
	4 3 3 3 3	-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	2 2 2	" <u>/</u> 4	$5\sqrt{3}$	(13)		
-5 -6 -5		5/5/3/3/4		ソとノヘ	5 5 7 7 7 T	3 7 3	A.	
-1-3-3 -6-4-4	15 19 14 13 13 15 15 15 11	5 9 5 5	3/3/-3/-1/1		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	7 3 3		
拉拉拉		[E] 6 44 / 3 5 / 9	565	3 1 1	2 4 5	7 3	They are	
			1.3 2.3 2.5 1.5 1.5	$\left\langle \frac{3}{2} \right\rangle$	ミメハン トノ トラ	5 7	3 133	
		1979		5 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	3 -1 1 2 4	5	3 133	
				5 -5 -5		4 8	7 3 133	th.
					5 7 7 1 2	4 5	7 3 13	
				14 (-3) 14 (-5)	1 - 1 1 - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 4	5 7 3	1331
. *			Ž,	6	3 6 3 71	2 4	5 7 3	1331
				闡	-5 -5 -3 -1 -5 -5 -3 -1 -5 -5 -3 -1 -9 -1 -3 -1	1 2 4	5 7 3	1:3 3 4
	•			116	1-5 1-5-1	1 2 4	5 7 3 5 7 3	1337
					1 -3 -5 -1		<del></del>	1332
	•				0 179		5 7 5	1937
PEC	NTF_BU	LKHEAD					0	26

DISPLAY:	= SX	/1000 ,	NODE=	1.	SURFACE=	2	•	1/1/1
-6 -6 -6 -5 -5 -5 -6 -6 -7 -7 -8 -8 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9	1 11 11 11 11 11 11 11 11 11 11 11 11 1	-5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -	11 11 5 -6 -6 -6 -6	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 -6 11 3 -6 11 3 -6 11 5 -5 -6 11 5 -6 -6 11 5 -6 -6 11 5 -7 -8 -8 -8 -8 -8 -8 -8 -8 -8 -8 -8 -8 -8	-6 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
			Z <sub>B</sub> 213 213 25 25 25 25 25 25 25 25 25 25 25 25 25		7 -6 -5 -5 -5 -6 -5 -5 -6	-5	11973	
		12.6			7 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5	5 -5 -3	-6 115	
•						-5 -5 -5 -5 -5	-3 -6 11 -3 -6 11	
						7-5 -5	5 -3 -6	
					10 10 10 10	11-1-1	-5 -3 -6 -5 -3 -6 -5 -3 -6	1153
	_			12.11.1	-1 -13 -9 8	-5 -5	-5 -3 -6	11521
SPEC 3.1	NTF BUL DOME	_KHEAD			·		<b>Q</b>	SCALE 26

ORIGINAL PAGE IS OF POOR QUALITY

F16 123



/1000 , NODE= 1 , SURFACF= DISPLAY= 7 ! 9 7 7 NTF BULKHEAD DOMF. SPEC 3.1

ORIGINAL PAGE IS OF POOR QUALITY

F16125

DISPLAY= SY /100C,	NODE-	1 .	SURFACE=	g .	1/1/1
	MODE-	1 7	OOM HOLL	<b></b>	
-7 -7 -7 -7 -7					_
	THE STATES	a est			,
	-7 -7	17 30 m			
13 13 13 13 13 13 13	1-7/-7	XX			
-13 -13 -13 -13 -13 -13 -13 -13 -13 -13	11/11/11	-7 /-7			
12/12/12/12/12/12/12/12/12/12/12/12/12/1	13 13 13	<u> </u>	7/2		
	2/12/13/1	3 11	X/-1 XXX		-
10-10-10-10-10-10-10-10-10-10-10-10-10-1	12/2/12	/-13/	7-7	\$ 3 m	
101019101010 7 10/107	XIIX.7."X.		13 /-11 /-7 >		
11 3 10 11 13 11 5 10 10 10 10	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-12	-13 -11 -7		•
	% / X10X1)	Z12X1	$\frac{2}{13}$ $\frac{11}{11}$	-7 1	
4 6 6 4 2 4 6 6 4 9 9 10	10/10/10/10	X1X1	2 -13 -11	1 -7 1	
11/2/1/6/1/6/1/	$\binom{13}{11}$ $\binom{10}{10}$	$\chi_{10}\chi_{10}$	12 -12 -13	711 -7	
[ [ [ [ [ ] ] [ ] [ ] [ ] [ ] [ ] [ ] [		19,2	112-12 -13	711 -7	<b>R</b>
12/8/2/1/1	X6/6 X113 X	V-10	10 11-12 -12	13 11 -7 1	
22		9 10	9 (10) 12 -12	123 CH-7 X	
		-11	-10 -10 -12 -1	/\~~/\ /	1 12
	2222	13	-10 -10 -12	-13 -7	THE PARTY OF THE P
· · · · · · · · · · · · · · · · · · ·	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	-6	9 -10 -10 112	-12 -13	1
	(5)	1 5		2 1-13	7
	12		-13 -10 10 1 -11 -10 10 1	12 -13 -13	~7 1 H
	<b>\</b>	1	6 -10 -10	1-12 -12 -13 -11	1-7
		BET	1-11-1-10 110	1-13 1	1-7-1-11
			-t-2 1-13 t-10	Marie I and I a	
		真	7 1_8 179 1		1 -7 1 8311
		탪	1 -6 1 10 - 1	0 1-12 -12 -13 -	11 -7 1 5 15
		10	-1 1-3   - 1 1		11 -7 1 5108
SPEC NTE BULKHEAD					0 26
SPEC NTF BULKHEAD 3-1 DOME					SCALE

DISPLAY= SX /1000 . MODE= 1 . SURFACE= 0

0	0	0	D	0	0	0	0	0	Ç	0	0	٥	a	C	U	ũ	ถ	O	O	0	D	D	0	0	0	0	0	0	0	0	٥	O	Q	0	0	0	0	0	0
2	2	-2	-2	2	-2	-2	-2	-2	-2	-2	-2	-5	-2	-2	-2	. 2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	2	2	-2	2	-2	-2	2	2	2
.3	13	.3	-3	-3	-3	-3	-3	-3	-3	-33	-3	-9	-3	-3	-3	-3	-3	-3	-3	-3	-3	3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	3	-3	-3	-3	3	Э.	3

SPEC

NTE BULKHEAD HATCH OPENING O SCALE

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 1

2	2	!	2	2	2	s	2	2	S	8		2	2	2	5	2	2	2	2	2	ω	5	5	Q.	5	2	2	2	2	5	2	2	2	s	2	2	2	2	2	5	2
-1	1	Ţ	i	-1	-1	-1	-1	-1	-1	-1	-	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1_	-1	,	-1	1_	-1	-1	1	-1	1	-1	-1	1
3	3	ŀ	3	-3	3	-3	-3	-3	-3	-:	1 -	-3	3	-3	-3	-3	-3	٠э	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	3	-3	-3	3	-3	3	.3	3	-3

SPEC 10.1 YTE BULKHEAD HATCH OPENING o 18

DISPLAY= SX /1000, NODE= 1, SURFACE= 2

1	1	1	-1 -	-1	-1	-1	-1	-1	-i	-1	-1	-1	-1	-1	-1	-1	-1_	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	1	1	1	1
L		_1					<u> L.</u>	L	<u>↓</u>	1_	1	<u> </u>	1	ــــــــــــــــــــــــــــــــــــــ			<u> </u>	<u> </u>	┖	1	1	-2	1		1	L	L	<u> </u>	L	i	L		l	Щ.					L Ł	
Ī	3	3	3	4	3	-3	-3	3	-4	-3	-3	-3	-3	-4	-3	-3	-3	-3	4	-3	-3	-3	-3	-4	-3	-3	-3	-3	- <b>u</b>	-3	-3	-3	-3	Ļų	3	-3	3	3	4	3

SPEC 10.1 NTE BULKHEAD HATCH OPENING 0 18 SCOLE DISPLAY= SY /1000, NODE= 1, SURFACE= 0

	0	0	٥	0	Ü	0	٥	0	0	0	0	0	0	0	٥	0	0	0	0	0	0	0	0	0	0	0	0	٥	0	0	0	0	0	0	۵	٥	0	0	0
C	o	0	0	ŋ	0	0	O	ņ	0	D	0	0	ū	0	Đ	0	r.	o	0	O	0	0	0	0	C	0	0	8	σ	٥	0	0	0	0	0	0	0	0	ũ
G	o	n.	0	0	ŋ.	D	0	٥	0	Ü	0	0	Đ	0	٥	0	0	0	٥	0	٥	0	0	0	0	0	۵	0	O	0	D	0	0	0	0	D	ø	0	٥

SPEC 10.1 NTF BULKHEAD HATCH OPENING Q 18

DISPLAY= SY /1000 . NODE= 1 . SURFACE= 1

5	5	5	5		5	5	5	5	5	5	5	5	5	Б	5	5	5	5	5	5	5	5	:5	5	5	5	5	ទ	5	5	5	5	5	5	5	5	5	5	5	5
5	2	Э	з	2	2	2	S	3	3	2	2	2	3	з	2	2	2	3	3	2	2	2	3	3	2	2	2	3	9	2	2	s	3	3	2	2	2	3	3	2
0	0	n	D	1	0	0	0	0	0	0	0	0	0	O	0	0	0	0	٥	0	0	0	0	٥	0	٥	0	0	0	٥	Ω	0	D	٥	0	0	0	٥	0	D

SPEC 10.1

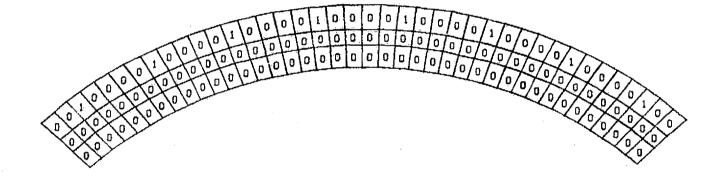
NTF BULKHEAD HATCH OPENING Q 18 SCALE

DISPLAY= SY /1000 , NODE= 1 , SURFACE= 2

-5	5	-5	-5	-5	-5	-5	-5	s	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	ร	-5	5	-5-	5
2	2	-2	-2	-2	5	-2	-2	-2	-2	-2	-2	-2	-z	-2	-2	-2	-2	-z	-2	-2	-2	-2	-2	-2	-2	-2	-2	-z	-s	-2	-S	-2	S	2	-2	2	·z·	2	z
0	0	-1	-1	-1	O	Ū	-1	-1	-1	0	C	-1	-1	-1	0	0	-1	-1	-1	٥	0	-1	-1	-1	٥	0	-1	-1	-i	0	٥	-1	-1	1	o	0	-1	1	-1

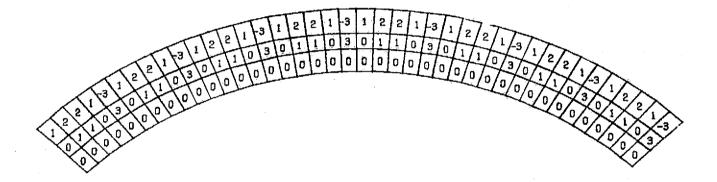
SPEC NTF BULKHEAD 10-1 HATCH OPENING Q <u>SCOLE 18</u>

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 0



SPEC NTF BULKHEAD 2-1 FLANGE SURFACE 0 <u>21</u>

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 1



SPEC

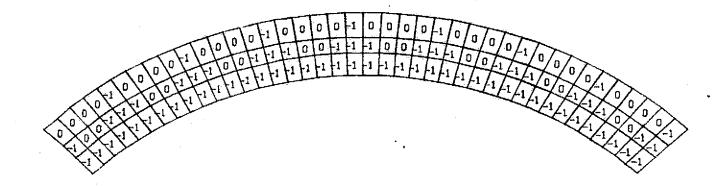
NTF BULKHEAD FLANGE SURFACE o 21 SCALE

DISPLAY= SX /1000, NODE= 1, SURFACE= 2

SPEC NTF BULKHEAD 2-1 FLANGE SURFACE

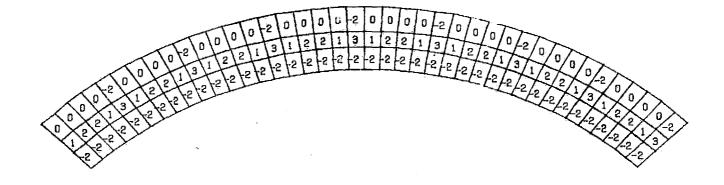
Q 21

DISPLAY= SY /1000 , NODE= 1 , SURFACE= 0

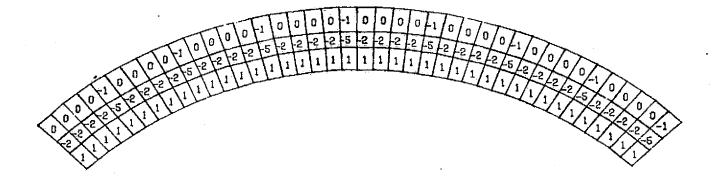


SPEC NTF BULKHEAD 2-1 FLANGE SURFACE

0 <u>21</u> SCALE DISPLAY= SY /1000 , NODE= 1 , SURFACE= 1

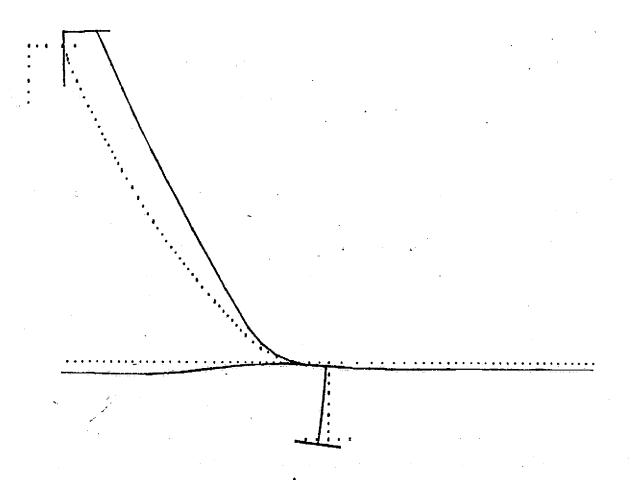


SPEC 2-1 NTF BULKHEAD FLANGE SURFACE 0 21 SCALE DISPLAY= SY /1000, NODE= 1, SURFACE= 2



SPEC NTF BULKHEAD 2.1 FLANGE SURFACE Q 21

F16 138

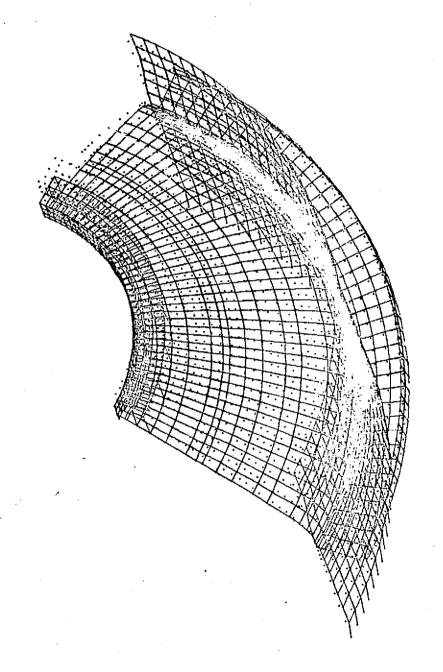


SPEC 12.1 NTF BULKHEAD CROSS-SECTION VIEW

D 27 SCALE

ORIGINAL PAGE IS OF POOR QUALITY

F16 139



SPEC NTF BULKHEAD

O SCALE

## CASE 5

GATE UALLE CLOSED

W/ TRANSIENT TEMPERATURE

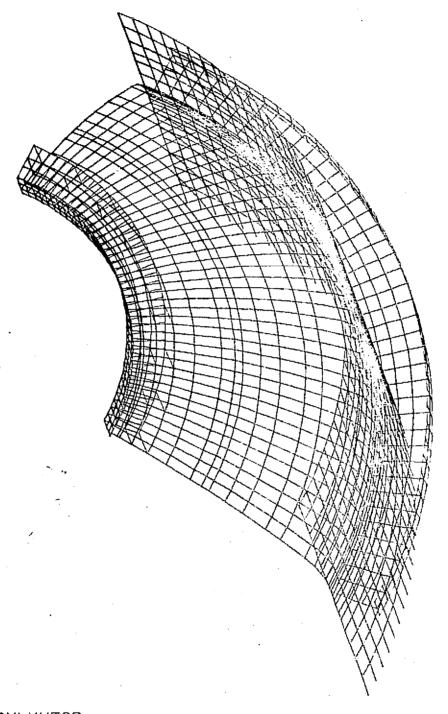
PROFILE, FOR HEAT UP TIME

OF 30 MIN.

STRESS PLOTS

FIGURES 141 THRU 167

COMPUTER RUN NO. AAK



SPEC NTF BULKHEAD ..VALVE OPEN AND TEMP DIST SCALE 41

F16. 141

DISPLAY=	SX	/1000 ,	NODE=	1.	SURFACE=	0

7 100	U ,	170	UU				1	. !	,		,	יוטנ	THU		-	U	
0	0	1	3	ų	5	5	4	2	H	_	3	-5	-3	5	10	15	16
0	0	1	3	4	5	5	4	2	_	4	3	-5	-3	5	10	15	16
0	C	1.	3	4	5	5	_	2	м	-	3	-5	-3	5	10	15	16
0	0		3	4	5	5	4		-	2	3	-5	-3	5	10	15	16
0	0	1	3	4	5	5	<del>-</del>	2	н	2	3	-5	-3	5	10	15	16
0	0	1	3	4	5	5	-	2	-	-	3	-5	-3	5	10	15	16
0	0	1	3	ų	5	-	13	5	Н	н	3	-5	-3	5	10	15	16
0	0	1	3	4	5	$\vdash$	4	-	Н	н	3	-5	3	5	10	15	16
0	0	1	3	4	5	5	Ц	2	Н	Η.	3	-5	-3	5	10	15	16
0	0	1-	₹_	4	5	5	-	2	H	Н.	3	-5	-3	5	10	15	16
D .	0	1	3	4	5	5	ų	}—	۲	н	3	-5	-3	5	10	15	16
0	0	1	3	4	5	5	-	-			3	-5	-3	5	10	15	16
0	0	1	3	4	5	5	1/2	5	Ц	3	5	-5	-3	5	10	15	16
0	0	1	3	4	5	5	4	2	빈	2	3	-5	-3	5	10	15	16
0	۵	1	3	4	5	5	4	S	4	2	3	-5	-3	S	10	15	16
0	0	1	3	31	5	5	ų	S	1	2	Э	-5	-3	5	10	15	16
0	0	1	3	4	5	5	4	2	1	2	3	-5	-3	5	10	15	16
0	O	1	3	4	\$	5	4	2	ı	2	3	-8	-3	5	10	15	16
0	0	1	3	4	5	5	4	2	1	2	Э	-5	-3	5	10	15	16
٥	Ç	1	3	4	5	5	4	2	4	2	3	<b>-</b> 5	-3	5	10	15	16
0	0	1	3	ų	ű	5	4	2	1	2	3	5	-3	5	10	15	16
ß	0	1	3	4	5	5	ij.	2	1	2	3	-5	-3	5	10	15	16
0	O	ı	3	4	5	5	ų	2	1	2	3	-5	-3	5	10	15	16
0	0	1	3	4	S	5	4	2	ŀ	2	3	-5	-3	5	10	15	16
_ 0	0	1	3	1 <u>1</u>	5	6	4	2	H	2	3	-5	-3	5	10	15	16
Ö	0	1	3	ų	5	5	4	2	1	2	3	-5	-3	5	10	15	16
0	٥ _	1	3	4	5	5	ц	2	i	2	3	-5	-3	5	10	15	16
0	0	1	3	4	5	5	4	2	H	2	3	-5	-3	5	16	15	16
Q.	Ū	l.	3	4	5	5	4	2	ı	2]	3	<b>-S</b>	-3	5	10	15	16
٥	0	1	3	4	5	5	ų	2	Н	2	3	-5	-3	5	10	15	16
0	0	1	3	ų	5	5	ų	2	i	2	3	-5	ъ÷	5	10	15	15
0	0	1	3	4	5	5	٠,—	2	₽.	2	3	-5	-3	5	10	15	16
0	a	1	3	4	5	5	4	2	H	2	3	-5	-3	5	10	15	16
٥	0	1	3	ц	3	5	ų	2	1	2	3	-5	-3	5	10	15	16
0	0	1	3	Ļ	5	5	-	2	1	리	3	-5	-3	5	10	15	16
0	0	1	3	4	5	5	4	2	Н	2	3	5	<del>-3</del>	5	10	15	16
0	0	1	3	4	5	5	4	+-	i	2	3	-5	-3	5	10	15	16
0	0	1 -	3	4	5	5	4	2	1	2	3	-5	-3	5	10	15	16
0	0	1 1	3	4	5	5	4	2	H	ş	3	-5 -5	-3	5	10	15	16
	1 0	<del></del>	L.J	1.3	1 0	lo.	1.1	IC.	П	<u>- 1</u>	ᆚ	<u></u> a	T_3_	1 13	LIU	1 10	10

SPEC 5.1 NTF BULKHEAD SHELL

Q 36 SCALE DISPLAY= SX /1000 , NODE= 1 , SURFPCE= 1

0         1         2         2         3         2         2         1-2         3-2	17 17 17 17 17 17 17 17 17 17 17 17
0       1       2       2       3       2       2       1-2       2+2       10       -13       -8       4       12       16         0       1       2       2       3       2       2       1-2       2+3       10       -13       -8       4       12       16         0       1       2       2       3       2       2       1-2       2+3       10       -13       -8       4       12       16         0       1       2       2       3       2       2       1-2       2+10       -13       -8       4       12       16         0       1       2       2       3       2       1-2       2+10       -13       -8       4       12       16         0       1       2       2       3       2       1-2       2+10       -13       -8       4       12       16         0       1       2       2       3       2       1-2       2+10       -13       -8       4       12       16         0       1       2       2       3       2       1-2       2+2       2+0 <td>17 17 17 17 17 17 17 17 17 17</td>	17 17 17 17 17 17 17 17 17 17
0       1       2       2       3       2       2       1-2       2-1-2       1-2       1-3       -8       4       12       16         0       1       2       2       3       2       1-2       1-3       10       12       16         0       1       2       2       3       2       1-2       10       13       -8       4       12       16         0       1       2       2       3       2       1-2       10       13       -8       4       12       16         0       1       2       2       3       2       1-2       2-10       -13       -8       4       12       16         0       1       2       2       3       2       1-2       2-2       10       -13       -8       4       12       16         0       1       2       2       3       2       1-2       2-2       10       -13       -8       4       12       16         0       1       2       2       3       2       1-2       2-2       10       -13       -8       4       12       16	17 17 17 17 17 17 17 17 17
O         1         2         2         3         2         2         1-2         2-3+10         -13         -8         4         12         16           O         1         2         2         3         2         2         1-2         2-3+10         -13         -8         4         12         16           O         1         2         2         3         2         2         1-2         2-2+10         -13         -8         4         12         16           O         1         2         2         3         2         2         1-2         2-2+10         -13         -8         4         12         16           O         1         2         2         3         2         1-2         2-2+10         -13         -8         4         12         16           O         1         2         2         3         2         1-2         2-2         3         2         1-2         2-2         10         -13         -8         4         12         16           O         1         2         2         3         2         1-2         2         2         3	17 17 17 17 17 17 17 17
0       1       2       2       3       2       2       1-2       2-3       0-13       -8       4       12       16         0       1       2       2       3       2       2       1-2       2-2       10       -13       -8       4       12       16         0       1       2       2       3       2       2       1-2       2-2       10       -13       -8       4       12       16         0       1       2       2       3       2       2       1-2       2-2       10       -13       -8       4       12       16         0       1       2       2       3       2       2       1-2       2-10       -13       -8       4       12       16         0       1       2       2       3       2       2       1-2       2-10       -13       -8       4       12       16         0       1       2       2       3       2       2       1-2       2-2       10       -13       -8       4       12       16         0       1       2       2       3	17 17 17 17 17 17 17 17
0         1         2         2         3         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         1         2         2         3         2         2         1         2         2         3         2         2         1         2         2         3         2         2         1         2         2         3         2         2         1         2         2         3         2         2         1         2         2         3         2         2         1         2         2         3         2         2         1         2         2         3         2         2         1         2         2         3         2         2         1         2         2         3         2	17 17 17 17 17 17 17
U     1     2     2     3     2     2     1-2     2-2     10     -13     -8     4     12     16       O     1     2     2     3     2     2     1-2     2     10     -13     -8     4     12     16       O     1     2     2     3     2     2     1-2     2     10     -13     -8     4     12     16       O     1     2     2     3     2     2     1-2     10     -13     -8     4     12     16       O     1     2     2     3     2     2     1-2     10     -13     -8     4     12     16       O     1     2     2     3     2     2     1-2     10     -13     -8     4     12     16       O     1     2     2     3     2     2     1-2     10     -13     -8     4     12     16       O     1     2     2     3     2     2     1-2     10     -13     -8     4     12     16	17 17 17 17 17
0     1     2     2     3     2     2     1-2     2-2     10     -13     -8     4     12     16       0     1     2     2     3     2     2     1-2     2-10     -13     -8     4     12     16       0     1     2     2     3     2     2     1-2     2-2     10     -13     -8     4     12     16       0     1     2     2     3     2     2     1-2     2-2     10     -13     -8     4     12     16       0     1     2     2     3     2     2     1-2     2-2     10     -13     -8     4     12     16       0     1     2     2     3     2     2     1-2     2-2     10     -13     -8     4     12     16       0     1     2     2     3     2     2     1-2     2-2     10     -13     -8     4     12     16	17 17 17 17 17
0     1     2     2     3     2     2     1-2     3-10     -13     -8     4     12     16       0     1     2     2     3     2     1-2     3-2     10     -13     -8     4     12     16       0     1     2     2     3     2     1-2     3-2     10     -13     -8     4     12     16       0     1     2     2     3     2     1-2     3-2     10     -13     -8     4     12     16       0     1     2     2     3     2     1-2     3-2     10     -13     -8     4     12     16	17 17 17 17
0     1     2     2     3     2     2     1-2     0-13     -8     4     12     16       0     1     2     2     3     2     2     1-2     92     10     -13     -8     4     12     16       0     1     2     2     3     2     2     1-2     92     10     -13     -8     4     12     16       0     1     2     2     3     2     2     1-2     92     10     -13     -8     4     12     16	17 17 17
0     1     2     2     3     2     2     1-23210-13     -8     4     12     16       0     1     2     2     3     2     2     1-23210-13     -8     4     12     16       0     1     2     2     3     2     2     1-23210-13     -8     4     12     16       0     1     2     2     3     2     2     1-23210-13     -8     4     12     16	17 17
0 1 2 2 3 2 2 1-29±10-13 -8 4 12 16 0 1 2 2 3 2 2 1-29±10-13 -8 4 12 16	17
0 1 2 2 3 2 2 1 2 3 2 1 1 2 1 6	
<del>┡╸═╸╸┩╶┅┉┪╴┈┈┩╶┈┩╼┦╸╜</del> ┆╀╶┩╴┦┦┥╌┧╴┈╾┼╾┈┤╴┈┝╶╌╂═┈┈┨	17
0 1 2 2 3 2 2 1 2 2 2 10 -13 -8 4 12 15	
	17
0 1 2 2 3 2 2 1 2 3 2 1 1 2 10 -13 -6 4 12 16	17
0 1 2 2 3 2 2 1-2 52 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1 2 3 2 0 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-3 63 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-2 5 2 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-2 2 2 10 - 13 - 8 4 12 16	17
0 1 2 2 3 2 2 1-2 3 2 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1 2 3 2 1 1 2 1 6	17
0 1 2 2 3 2 2 1-25210 -13 -6 4 12 16	17
0 1 2 2 3 2 2 1-2 9-3 10 -13 -8 4 12 16	17
0" 1 2 2 3 2 2 1 2 2 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-25210-13 -8 1 12 16	17
0 1 2 2 3 2 2 1 2 3 2 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1 2 3 2 0 - 13 - 8 4 12 16	17
0 1 2 2 3 2 2 1 2 3 2 0 - 13 - 8 4 12 16	17
0 1 2 2 3 2 2 1-2 3 2 10 -13 -8 4 12 15	17
0 1 2 2 3 2 2 1 2 3 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-29310-13 -8 4 12 16	17
0 1 2 2 3 2 2 1-20210-13 -8 4 12 16	17
0 t 2 2 3 2 2 1 2 3 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-2 0 2 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-2 3 2 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-2 3 2 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-2 3-2 10 -13 -8 4 12 16	17
0 1 2 2 3 2 2 1-2 0 2 10 -13 -8 4 12 16	17

SPEC 5.1 NTF BULKHEAD SHELL

O 36

DISPLAY=	SX	/1000 .	NODE=	1.	SURFACE=	2
D101 CH1 -	UA	/ 1000 F	11000	17		

1.00		140	البال				1	1			U	יוטו	a ma	- سلام	-	_	
0	0	1	3	5	В	8	7	7	Ð,	11	3	3	2	6	Ð	13	16
0	0	1	3_	5	8	8	7		В		_	3	2	6	8	13	16
0	0	1	3	5	8	В	2		-	<u> 11</u>		3	2	5	8	13	16
0_	0	_1_	3	5	8	8	7	<u></u>		-	+	3	2	6	8	13	16
0	0	1	3	5	8	8	7	_	8	+-	+-	3	2	6	8	13_	16
0	0	1	3	5	8	8	-		8	31.5	_	3	2	6	8	13	16
0	0	_ !	3	5	8	8	7	Н	+	+-	-+-	3	2	6	6	13	16
0	0	1	3	5	8	8	7	-	H	5 L S	+-	3	2	6	8	13	16
0	0	1	3	5	8	8	7	_	8	-	<b>-</b> }-	3	2	Б	8	13	16
0	0	1	3	5	8	8	1	_	_	5 1 5		3_	2	6	8	13	16
0	0	1	3	5	8	8	7	-	++	311	-	3	5	8	8	13	16
0_	0	1	3	5	8	8	-	7	-		+	3	2	6	8_	13_	16
0	Ð	1	3	5	8	В	7	7	B	1 :	1	3	2	В	8	13	16
0	0	1	3	5	8	8	7	7	3	5 13	5].	3	5	6	8	13	16
_ 0	0	<u>i</u>	3	5	8	8	7	7	Ė	3 1 !	5	3	. 2	6	8	13	16
0	0	1	3	5	8	8	7	7	8	3 [ [	5	3	2	6	8	13	16
0	0	1	3	5	8	8	7	7	3	5 1	5	3	2	6	8	เฮ	16
0	0	1	3	5	8	8	7	7	8	3 L	3	3	2	6	8	13	16
0	0	1	3	5	B	ខ	7	7	8	5 1	5	3	2	6	-8	13	16
0	0	1	3	5	8	В	7	7	8	6 1	5	3	2	6	8	13	16
0	0	1	3	5	8	8	7	7	5	5 1	5	3	2	Б	8	13	16
0	Ö	1	3	5	8	8	7	7	6	5 1	5	3	2	6	8	13	16
0	0	1	3	5	В	8	7	7	8	6 !!	5	3	2	6	8	i 3	16
0	0	1	Э	5	8	Ø	7	7	9	5 1	5	3	2	6	8	13	16
0	0	i	3	5	в	8	7	7	3	5 1	5	3	2	6	8	13	16
Ū.	0	1	3	5	ខ	8	7	7	8	61	5	3	5	6	в	13	16
0	0_	1	3	5	8	8	7	7	į,	6 1	5	3	2	6	В	13	16
٥	0	1	3	5	8	8	7	7	Ŕ	5 1	5	3	2	6	8	13	16
0 /	0	. 1	3	5	8	8	7	$\bar{\gamma}$	ρĺ	6 L	5	3	2	6	8	13	16
0	0	1	3	5	B	8	7	7	βĺ	6 1	ธโ	3	2	6	в	13	1.6
O	Q	1	3	5	8	В	7	7	E	តី 1	5	3	2	6	8	13	16
0	0	1	3	5	8	8	7	7	8	6 L	5	3	2	6	В	13	16
0	O	1	3	5	8	8	7	7	8	<u> </u>	5	3	2	3	Θ	13	15
0	0	1	3	5	8	8	7	_	-	<u> </u>	5	3	2	В	ប័	is	16
D	C	1	3	5	8	8	7		8		-+	3	2	6	8	13	15
0	0	1	3	5	8	8	7	+		_	-+	3	2	8	8	13	16
0	0	1-1-	3	5	8	8	-		3		-+	3	2	6	8	13	16
0	0	1	3	5	8	8	7		9			3	2	6	8	13	16
0	0	1-	3	5	8	8	7	7	9	ខ្លារ		3	2	6	8	13	16
L U	1 0	1 1		10	10	15	1 1	1/	Į.	<u> </u>	낖	<u>ب</u>	<u> </u>	10	<u> </u>	1-1	1 10

SPEC 5.1 NTF BULKHEAD

<u>0 36</u> SCALE DISPLAY= SY

/1000 , NODE=

1 ,

SURFACE=

0

0	0	0	0	lo	0	lo	0	la	ולו	э э	3	5	8	8	8	В
0	0	0	0	ō	0	o			D		3	5	В	В	8	8
0	0	0	0	O	0	0	Q	0	υļ	3	3	5	8	8	8	8
0	0	0	0	0	0	0	0	0	þ!		3	5	8	8	8	8
0	0	0_	0	0	0	0	0	0	þ	_	3	5	8	8	8	8
0	0	0	0	0	C	0	0	-	C		3	5	8	8	8	8
0	0	0	0_	0	0	0	10	1-	D.		3	5	8	8	8	8
0	0	0	0	0	0	0	<del></del>	<del> </del>	þ	+	3	5	8	8	8	8
0	0	0	3	0	0	0	<b>-</b>	┡	ם וכן		3	5	8	В	8	8
0	0	0	0	Ö	0	0		Ι	뱌		3	5	8	8	8	8
0	۵	0	0	0	0	O	0	0	p	3	3	5	8	8	8	8
0	0	0	0	0	0	0	C	0		3	3	5	8	8	8	8
O	0	0	0	٥	٥	0	0	0	0	) <u>3</u>	3	5	8	Ð	8	8
0	0	Ò	0	C)	٥	0	0	D	þķ	3	3	5	8	8	ម	В
D	0	Û	0	0	0	0	0	٥	u	3	3	5	8	В	8	8
0	0	0	0	٥	0	0	Q	0		) з	3	5	B	8	6	8
0	0	0	0	0	0	0	0	0		3	3	5	8	8	8	13
0	Ð	۵	٥	۵	0	۵	0	0	0	3	3	5	8	8	8	8
O	0	0	0	0	0	0	o	a	blo	3	3	5	8	В	8	8
٥	0	٥	0	0	0	٥	o	0	200	3	3	5	8	B	8	8
0	0	۵	0	O	0	0	0	0	ρú	3	3	Б	8	8	8	8
D	Ū	0	ø	O	0	o	σ	0	oļ.	3	3	5	8	8	8	θ
0	0	0	0	0	0	0	0	0	o	3	3	5	8	В	8	8
0	0	۵	0	0	0	O	O	0	ö	3	3	5	Ð	8	Э	8
٥	۵	D.	0	Đ	0	0	٥	0	οlo	3	3	5	8	8	8	Ð
Ō	0	0	0	0	0	0	0	a	υc	3	3	5	8	8	8	8
0	0	0	۵	0	0	0	0.	O	J.	3	3	5	В	8	8	8
0	0	O	0	0	0	Û	0	0	ō,	3	3	5	8	8	ਰ	8
0	Ð	Ü	0	0	0	O	٥	C		3	3	S	8	В	8	8
0	0	0	Ü	0	0	0	0	O.	o.	3	3	5	8	8	6	8
O	0	a	0	0	۵	0	ú	O		3	3	5	8	8	8	8
0	0	0	0	0	0	ō	0	0	οC	3	3	5	8	В	8	В
0	0	0	0	0	٥	0	0		0		3	5	8	8	8	В
O	0	٥	0	0	C	٥	0	۵	9	3	3	5	8	8	₽	8
C	0	0	0	0	C	0	0	-			Ð	5	8	8	8	8
0	0	0	0	Ō	0	0	_	_	00	+	3	5	В	В	8	8
0	0	0	0	0	0	Ö	-	0	Ų.	3	3	5	8	6	8	8
0	0	0	0	Ō	0	0	0	O n		-	3	<u>5</u> 5	8	3	8	8
0	0	0	0	0		0	0			+	3	5	පි	6	8	8
	ַט		<u> </u>	<u>, u</u>	Ц.	٧	u	ᆫ	بالب	1 3	زري		<u> </u>	<u> </u>	Ü	_ '

SPEC 5.1

NTF BULKHEAD SHELL

SCALE

SY /1000, NODE= 1, SURFACE= 1 DISPLAY=

٥	1	1	-i	-4-	1.6	1 +	1-1	E	4	38	-22	-11	5	13	13	9
Ō	i	1	-1	-4-	10	-	-	ī	+-	38	-22	-11	5	13	13	. 9
C	1	1	-1	-4 -	1 G	i +	1-1	ξ.	Ţ	38	~22	-1 i	5	13	13	ė
0	1	1	-1	-4 -						36	-22	-11	5	13	13	9
0	_1	1	-1	-4-						38	-22	-11	5	13	13	9
0	1	1	-1	-4-	16	1÷	lΞ	丘	'n	38	-55	-11	5	13	13	9
0	1	1	-L	-4-	10	1+	1-1	15	11	38	-55	-11	5	13	13	9
0	1	1	-1	-4-		_	_		+-	38	-22	-11	5	13	13	. 9
0	_1	1	-1_	-4 -	-			-	+	38	-22	-11	5	13	13	3
0	1	1	-1	-4-	10	1+	1-1	4	4	38	-22	-11	5	13	13	9
٥	1	1	-1_	-4 -	10	1-1	1-1	4	Ľ	38	-52	-11	5	13	13	9
0	1	1	-i	-4-	Į G.	1-1	1-1	6	4	38	-22	-11	5	13	13	9
۵	1	1	-i	-4-	10	1 4	1-1	l-d-	41	38	-22	-11	5	13	13	9
0	1	1	-1	4.	10	14	1-1	1	4	38	-22	~11	5	13	1.3	9
0	1	1.	-1	-4 -	16	14	1-1	1	4	38	-22	-11	5	13	13	9
0	1	1	-1	-4-	10	1 1	H	- 6	4	38	-22	11	5	13	13	3
0	ī	1	-l	.4	10	1 1	L-i	H	Ţ	38	-22	-11	5	13	13	9
O	l .	l	-1	-4-	10	1+	1-1	-6	1	38	-22	-11	5	13	13	9
O	1	i	-1	4-	10	1±	14	1-7	4	38	-22	-11	5	13	13	9
O	1	1	-1	-11 -	10-	1.1	ι-i	-4	4	38	-22	-11	5	13	13	9
O	l	i	-1	-4.	10	14	1-1		1	38	-52	-11	5	13	13	9
0	ı	1	-1	-4-	10	j ÷	1-1		41	38	-22	-11	5	13	13	9
0	ı	ı	-1	щ.	10	14	1-1	-6	1	38	-22	-11	5	13	13	9
0	1	1	-1	-4 -	10	1 -	ι÷		1	38	-22	-1 i	5	13	13	9
_0	t	1	-1	-4-	1 G	1-1	1-1	0	4	38	-22	-11	5	13	13	9
Ū	1	1	-1	-ц-	10	Ι÷	1-1	-6	1	436	-22	-11	5	13	13	9
0	1_	1	-1	щ.	19	1 <del>-t</del>	1-1	Ε.	1	38	-22	-11	5	13	13	9
0	l.	L	-1	ų.	10	1-2	1-1		4	38	-22	-11	5	13	13	9
0 /	l	1	-1	-11 -	10	1 ±	1-1	-	1	38	-22	-11	5	13	13	9
0	L	1	1	-4-	10	1-1	l-l	Ę.	4	38	-22	-11	5	<u>i3</u>	13	9
Ü	L	1	-1	4-	10	14	1-1	-6	1	38	-22	- 1 1	5	13	1:3	9
0	l	Ĺ	-1	-ч.	10	1+	1-1	4	ı.	38	-55	-11	5	13	13	9
C	1	i	-1	4	10	1 -	ļΗ	13	1	38	-2 <b>2</b>	1i	5	13	13	9
0	1	1	-1	-냭-	ιD	1 4	1-1	3	1	38	-22	-11	5	!3	13	9
0	1	1	<u>-1</u>	ц.	10	1 1	1-1	4	ا	35	-22	-11	5	13	13	9
0	l_	1	-1	Ц.	10		1	1-1	+	38	-02	-11_	5	13	13_	9
0	1	1	-1_	-ų.	1 G	<del></del>	<u>-</u>		т.	-	-22	-11	5	13	13	9
0	1	1	1-1	11.		•		ļ., .ķ.	-	130	-22	-11	5	13	13	9
0	1	1	- <u>L</u>  -L	-4-	10	1	1	H	1	43B	-22	<u> </u>	5	13	13	9
	1	<u> </u>	1-1	-4	110	17.7	11-1	E I	7	438	-22	1-11	5	<u>1_13_</u>	13	1 3

SPEC 5.1

NTF BULKHEAD SHELL

DISPLAY= SY /1000 . NODE= 1 . SURFACE= 2

O																
0				<del></del>	-		141									
0 -1 -1 1 4 101d 15 4 15 2 3 2 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 3 2 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 7 0 -1 -1 1 4 101d 15 4 15 2 2 2 0 10 2 2 2 7 0 -1 -1 1 1 4 101d 15 4 15 2 2 2 0 10 2 2 2 7 0 -1 -1 1 1 4 101d 15 4 15 2 2 2 2 0 10 2 2 2 7 0 -1 -					<del>-</del>	_	101									
0					<u> </u>		~	1	1_1_	<u> </u>						
0 -1 -1 1 1 4 10101111111111111111111111	<del></del>			<del></del>	-	_		<del>, , , , , , , , , , , , , , , , , , , </del>					1	-		
0 -1 -1 1 1 4 10 10 11 5 4 4 5 23 20 10 2 2 7 7 0 -1 -1 1 4 10 10 11 5 4 4 5 23 20 10 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 4 4 5 23 20 10 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 4 4 5 23 20 10 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 4 4 5 23 20 10 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 4 4 5 23 20 10 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 4 5 5 23 20 10 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 10 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 10 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 10 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 5 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 1 4 10 10 11 5 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 1 4 10 10 11 5 5 5 5 20 20 10 2 2 2 7 7 0 0 -1 -1 1 1 4 10 10 11 5 5 5 5 20 20 10 2			<del> </del>		<u> </u>			<del></del>	<del></del>						i <del></del>	
0				-	-				4-4-							
0 -1 -1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ļi			ļ		1		_	₩,				<del>  </del>			
0 -1 -1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					<del>-</del> -	ļ		+	++				<del> </del>			
0 -1 -1 1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10101115 4 45 29 20 20 10 2 2 7  0 -1 -1 1 1 4 10101115 4 45 29 20 20 10 2 2 7  0 -1 -1 1 1 4 10101115 4 45 29 20 20 10 2 2 7  0 -1 -1 1 1 4 10101115 4 45 29 20 20 10 2 2 7  0 -1 -1 1 1 4 10101115 4 45 29 20 20 10 2 2 2 7	<u> </u>				-	<del> </del>			4-1-				i			
0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 20 10 2 2 7	<del></del>		<del> </del>		-	-	_	4-1	++	—~i-			h			
0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 1 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 2 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 2 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 2 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 4 5 2 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 1 3 4 5 5 7 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7		ļ			<del> </del>	<del></del>	<del>j-</del> -	4-5	<del></del>							
0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 29 20 10 2 2 2 7					<del>-</del>		-1-		++				<del></del>			
0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 5 4 5 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 5 4 5 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 5 4 5 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 5 4 5 5 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 5 4 5 5 29 20 10 2 2 2 7			-			-		┨┤	++	-i						
0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 20 20 10 2 2 7			<del> </del>		ļ- <u>-</u> -		-+-	<del>1 i</del>	++	F						<u> </u>
0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 2 7  0 -1 -1 1 1 4 10 10 11 5 4 45 29 20 10 2 2 2 7				<del>                                     </del>	-		+	+-+	┪-{-	+						
0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 20 20 10 2 2 2 7	0	-1	<del>-</del> L	1	14	<del> </del>		╼╅	+-	-+	29	20	10	2	2	
0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7	0	-1	-1	L	4	10	ı dı	1] 5	1111	15	59	20	10	_2_	5	
0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 19 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 5 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 5 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 5 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 5 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 5 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 5 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 5 5 29 20 10 2 2 7  0 -1 -1 1 4 10101 15 4 5 5 29 20 10 2 2 7	O	-1	-1	1	ų	10	101	1 5	d di	15	53	20	10	2	5	7
0 -1 -1 1 4 101011154445 29 20 10 2 2 7  0 -1 -1 1 4 10101115445 29 20 10 2 2 7	O	-1	-1	1	4	10	ı dı	1) \$	444	15	29	20	10	2	2	_7
0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10101115 4 5 29 20 10 2 2 7	0	-1	-1	ı	4	10	ıdı	19	44	15	29	20	10	2	2	7
0 -1 -1 1 4 10101154445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 25 20 10 2 2 7  0 -1 -1 1 4 1010115445 25 20 10 2 2 7  0 -1 -1 1 4 1010115445 25 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 10101154495 29 20 10 2 2 7  0 -1 -1 1 4 10101154495 29 20 10 2 2 7  0 -1 -1 1 4 10101154495 29 20 10 2 2 7  0 -1 -1 1 4 10101154495 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7  0 -1 -1 1 4 1010115445 29 20 10 2 2 7	0	-1	-1	ı	4	10	ıqı	11 5	4	15	29	20	18	2	2	7
0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 29 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 29 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 25 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7	0	-1	-1	1	4	10	101	115	14	15	29	20	10	2	2	7
0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 25 20 10 2 2 7  0 -1 -1 1 4 10101115 445 25 20 10 2 2 7  0 -1 -1 1 4 10101115 445 25 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7  0 -1 -1 1 4 10101115 445 29 20 10 2 2 7	0	-1	-1	1	ų	10	iqi	11.5	44	15	29	20	10	2	2	7
0°         -1         -1         1         4         10 1 0 1 1 8 4 4 5 25 20 10 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 25 20 10 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 25 20 20 10 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 25 20 20 10 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 20 20 20 10 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 20 20 20 10 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 20 20 20 10 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 20 20 10 2 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 20 20 10 2 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 20 20 10 2 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 20 20 10 2 2 2 7           0         -1         -1         1         4         10 1 0 1 1 8 4 4 5 20 20 20 10 2 2 2 7	٥	-1	-l	1	4	10	101	11.5	դփ	15	29	20	10	2	2	7
0       -1       -1       1       4       10 1 G 1 1 5 4 4 9 5       25       20       10       2       2       7         0       -1       -1       1       4       10 1 G 1 1 5 4 9 5       25       20       10       2       2       7         0       -1       -1       1       4       10 1 G 1 1 5 4 9 5       29       20       10       2       2       7         0       -1       -1       1       4       10 1 G 1 1 5 4 9 5       29       20       10       2       2       7         0       -1       -1       1       4       10 1 G 1 1 5 4 9 5       29       20       10       2       2       7         0       -1       -1       1       4       10 1 G 1 1 5 4 9 5       29       20       10       2       2       7         0       -1       -1       1       4       10 1 G 1 1 5 4 9 5       29       20       10       2       2       7         0       -1       -1       1       4       10 1 G 1 1 5 4 9 5       29       20       10       2       2       7         0       -1       -1	0	-1	-1	1	ų	10	iqi	11.5	4,	15	29	Si)	10	Ξ	2	7
0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 5 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 5 5 29 20 10 2 2 7	ū.	-1	-1	1	4	10	ıqi	11.8	4	15	25	20	10	2	5	7
0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 5 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 5 5 29 20 10 2 2 7	0	-1	-1	1	4	10	ıcı	11 5	10	15	25	20	10	2	2	7
0 -1 -1 1 4 101011111115 29 20 10 2 2 7  0 -1 -1 1 4 10101111115 495 29 20 10 2 2 7  0 -1 -1 1 4 101011111115 495 29 20 10 2 2 7  0 -1 -1 1 4 101011111111 29 20 20 10 2 2 7  0 -1 -1 1 4 101011111111 29 20 20 10 2 2 7  0 -1 -1 1 4 1010111111111 29 20 20 10 2 2 7  0 -1 -1 1 4 101011111111 29 20 20 10 2 2 7  0 -1 -1 1 4 101011111111 29 20 20 10 2 2 7  0 -1 -1 1 4 101011111111 29 20 20 10 2 2 7  0 -1 -1 1 4 1010111111 29 20 20 10 2 2 7  0 -1 -1 1 4 101011111 29 20 20 10 2 2 7		-1	-i	1	4	1	_	1-7	F		25	120	10	2	5	7
0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 3 4 4 5 29 20 10 2 2 7		-1	-1	1	4	10	101	113	14	15	29	80	10	2	5	7
0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7	0	-1	-1	1	ц	10	101	1 1	111	15	29	20	10	5	5	7
0 -1 -1 1 4 10 1011 8 4 945 28 20 10 2 2 7  0 -1 -1 1 4 10 1011 8 4 945 28 20 10 2 2 7  0 -1 -1 1 4 10 1011 8 4 945 28 20 10 2 2 7  0 -1 -1 1 4 10 1011 8 4 945 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 8 4 945 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 8 4 945 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 8 4 945 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 8 4 945 29 20 10 2 2 7	0	-i	-1	1	4	10	ıdı	114	1 4	15	29	20	10	2	2	7
0 -1 -1 1 4 10 1011 8 4 945 28 20 10 2 2 7  0 -1 -1 1 4 10 1011 8 4 945 28 20 10 2 2 7  0 -1 -1 1 4 10 1011 8 4 945 28 20 10 2 2 7  0 -1 -1 1 4 10 1011 8 4 945 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 8 4 945 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 8 4 945 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 8 4 945 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 8 4 945 29 20 10 2 2 7	0	-1	-1	ī	4	10	ıdı	14	44	15	29	20	10	S	5	7
0 -1 -1 1 4 10 10 11 8 4 445 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 8 4 445 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 8 4 445 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 8 4 445 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 8 4 445 29 20 10 2 2 7  0 -1 -1 1 4 10 10 11 8 4 445 29 20 10 2 2 7	0	-1	-1	1	4	+		-	1 1	:	29	20	iØ	5	2	7
0 -1 -1 1 4 10 1011 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 1011 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 1011 5 4 45 29 20 10 2 2 7  0 -1 -1 1 4 10 1011 5 4 45 29 20 10 2 2 7	٥	-1	-i	1	ц	10	101	11 5	գի	15	23	20	10	2	2	7
0 -1 -1 1 4 10 1011 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 5 4 4 5 29 20 10 2 2 7  0 -1 -1 1 4 10 101 1 5 4 4 5 29 20 10 2 2 7	0	-1	-i	1	ų	4					23	20	10	5	2	7
0 -1 -1 1 4 101011151445 29 20 10 2 2 7 0 -1 -1 1 4 10101115445 29 20 10 2 2 7	0	- <u>l</u>	-1	1	4	_		-					10	5_		
0 -1 -1 1 4 10 10 11 5 4 45 29 20 10 2 2 7		<del>}</del>	<del></del>	<del> </del>	<del></del>			-		···			,		<del></del>	
		· · · · · · · · · · · · · · · · · · ·	<del></del>	<del> </del>	<u>,                                     </u>					_			;		<del></del>	
n 1-1 1-1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			<del>  -                                   </del>	<del> </del>	+	+	-	-1					1			
	Г_п_	1 -1	T_7	I I	17.	<u>ात</u>	1 Ar	<u>1; 0</u>	1.3	70]	23	<u>cu</u>	110	٠.	1 5	

SPEC 5 1 NTF BULKHEAD SHELL

O 36 SCALE

ORIGINAL PAGE IS OF POOR QUALITY

						1/1/1
	1000 , NODE=	1. S	URFACE=	0		
DISPLAY= SX /1	[000 , 1000	1, -				
20 20 30 31 37 37						
13 13 13 13 13 13						
5 5 5 5 5 5	13/13/13/13/13/13/13/13/13/13/13/13/13/1	a				
1,1,1,1,1	5 5 5 13 13	The same				
<b> - - - - - </b>	1 1 5 5	(3) (3) M				
-3 -3 -3 -3 -3 -3		5 / 33	\$184.			
-2 -2 -2 2 2 2	[3/-3/-3/-3/-	$\sqrt{\frac{5}{5}}$				
	1-2 /-3 /-3 /-3	1 5	S XXXX		•	
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -	1 -2 -2 -3 -3	$X_1X$	<b>)</b>			
	F1 -1 -2 -2	(-3 / <sub>-3</sub> / 1)	^\	A.		
		2/-2/-3/-3	X1X 5/3	X		
2 2 2 2 2 2 2 2		\\\_2\\\\_\!	_3 \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	73 × 23 × 3		
777777	2/2/2/2/-1/-1/-1	1/-1/-2/2	X <sup>-3</sup> /\'\/	5		•
\-\-\-\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	/2/2/X1/	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	2 -3 -1	5 X 28		
100011000	17/7/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2	<b>∠</b> 1 <b>X</b> 1 <b>X</b> -1 <b>X</b>	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1 5		•
3 3 3 3 3 3 3 3 3	11/0/2/17/2/2/2		2 $3$	(1) 5	ZA.	
-696653605050505033 3/3/3/	33/20/1/27/2	$\binom{2}{2}$ $\times$ $\binom{1}{2}$	1)<-1><-2><-3	1 5		
2060		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1 1 -2	3 1 5	13	
		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		-3 1	5 1313	
	3/3/1/				5 43	Na .
		~\^\	2 X13 X-1 X	(-2) -3 \ 1	13	Ŧ.
	~ × × × × × × × × × × × × × × × × × × ×	\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	(2) (1) (1)	1-2 1-3	5 (13)	P.
•		33/0/	公主	1 2 3	1 5	推走
	¥	30 3 7 0 7	3-13-13-13	1-1 7-3	\ 1 \	र्भस्य
		3 1	7 2 111	1-1 12	1 5	1.1
		160 3 1 1	3 1 2 1	17-11-1-	1 5	177
-		100 3	0 1 2 1	til-1-1-1-	3 1 5	
		59H3	0 2 2	117-11-21		5 1329
			11-1-1	-1 11 - 1 -		5 134
		1001 - 1501 -	101712	111-1 -2	-3 1	5 132413
		-591 3 -601	9 1 0 1 7 1 5	-1 -1 -2	+	5 1323
		-601	3 1 7 2	-1 -1 -1 -2	-3 1	
	KUEAD				Q	26
SPEC NTF BULK 3.1 DOME	NHEHU .				·	SCALE
3•1 DOLL						•

F16 148

DISPLAY=	SX	/1990	, NODc=	1 ,	SURFACE=	1		1/1/1
13 (9 15 15 11 11 7 7	19 14 1 15 15 11 11 11 11 7 7 7 7 2 2 2 3 3 3 3 4 4 4 4 3 3 3 3 3 3 3	2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	15 15 15 15 15 15 15 15 15 15 15 15 15 1	15 15 15 11 11 11 11 1	5 15 15 15 15 15 15 15 15 15 15 15 15 15	11 15 15 15 15 15 15 15 15 15 15 15 15 1	15 15 15 15 15 15 15 15 15 15 15 15 15 1	
4						3 2 3 3 4 3 3 4 3	7 11 15 2 7 11 2 7 11 2 7 11 2 7 11 2 7 11 2 7 11 2 7 11	15 35
SPEC	NT <sub>E</sub> RI	II KHEAD	•				0	2

1/1/1 DISPLAY= SX /1000 , NODE= 1 , SURFACE= -9 -5 -5 -9 NTF BULKHEAD DOME SCALE

DISPLAY= SY /1000 .  -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2 -	NODE= 1,	SURFACE=	0 .	1/1/1
-3   -3   -3   -3   -3   -3   -3   -3	-3 -3 -3 -3 -3 -4 -4 -4 -4 -4 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3		
-4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -		-3 -3 -3 -2 -3 -3 -3 -3 -4 -4 -4 -4 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
7777799777977956	-4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -		-3 -3 -3 -3 -3 -4 -4 -4 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	
	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4	-4 -4 -3 -3 -3 -4 -4 -4 -4 -3 -3 -4 -4 -4 -4 -3 -3 -3 -3 -4 -4 -4 -4 -3 -3 -3 -4 -4 -4 -4 -3 -3 -3 -4 -4 -4 -4 -3 -3 -3 -4 -4 -4 -4 -4 -3 -3 -4 -4 -4 -4 -3 -3 -4 -4 -4 -4 -4 -3 -3 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4 -4	-12/2M
	7	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-11 1-11 1-3	3 -3 2-22
SPEC NTF BULKHEAD 3.1 DOME	<u>{B.</u> {	<u>-9  -5  -4   -4   -4   -4   -4   -4   -4  </u>	111 - 1 - 1 - 1	Q SCALE

DISF	PLAY= SY	/1000 .	NODE=	1,	SURFACE=	1	. 1/1/1
	10 10 10 10 10 10 10 10 3 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	11 11 11 11 11 11 11 11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	11 11 11 11 11	11 11 11		
	1919		2 2 4 6 4 5 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7	3 3 3 3 3 3 3	8 9 10 10 7 9 10 10 3 8 9 10 10	会 ( ジー( ロ ) /	3 1 1
•			19 35 5 2-2 3 3 5 5 7 3 3 5 7 3 3 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7 5 7	0 -4 0 -5 0 -4 -3 -3 -2 -2	3 8 9 10 3 3 8 9 10 3 3 8 9 10	10 11 11 11 10 10 11 11	9 11 9
	•			3 0 3 5 5 5 5 5 5 5 7	3 8 3 8 3 8 3 8 3 8 3 8 3 8 8 3 8 8 8 8	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	-1-1 9 11-19 P
				5 5 5 5 5 5 5	-2 -3 3 -2 -3 3	8     9     10     10     1       8     9     10     10     1       7     5     10     10     1       8     9     10     10     1	1 11 9 1 525 1 11 9 1 525
SPEC 3-1	NTF BU DOME	ILKHEAD					0 SCALE

F16 152

DISPLAY= SY /1000 , NCDE= 1 , SURFACE= 2	1/1/1
DISPLAY= SY /1000 , NODE= 1 , SURFACE= 2    1	1/1/1
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5 4 4
SPEC NTF BULKHEAD Q_ 3-1 BOME	SCALE

ORIGINAL PAGE IS OF POOR QUALITY

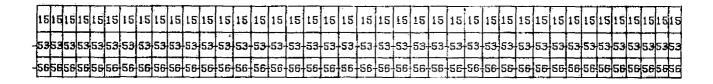
DISPLAY= SX /1000 , NODE= 1 . SURFACE= 0

	12	2	12	12	12	12	12	1:	2 1	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
-	53	3	53	53	53	53	53	5:	3	53	53	53	53	53	53	53	53	53-	53	53	53	-53-	53.	53-	53	-53-	53	·53·	53	53	53	53	53	53	53	53	53	53	53	53	53
-	58	g	58	58	56	358	55	5	8	58	58	58	58	58	58	58	50	58	58	58	58	58	58	58	58	58	58	58-	58	58	58	58	58	58	58	58	58	58	58	58	58

SPEC 10.1

NTF BULKHEAD HATCH OPENING 0 18 SCRLE

DISPLAY= SX /1000 . NODE= 1 . SURFACE= 1



ORIGINAL PAGE IS OF POOR QUALITY

SPEC NTF BULKHEAD
10-1 HATCH OPENING

Q SCALE

DISPLAY= SX /1000 , NODE= 1 , SURFACE= 2

	9	9	9	9	9	9	9	9	9	9	9	9	7	9	9	9	9	9	9	9	9	9	93	9	3	9	9	93	93	υ,	9	9	93	9	9	3	9	9	9	9
-[	54	54	54	54	54	54	54	54	54	54	54	54	54	54-	54	54	54	54	54-	54	-54	-54-	54-	54.	54-	54	54-	54	54-	54	54	54	54	54	54	54	54	54	54	54
-	39	59	60	60	60	59	59	60	60	60	59	59	60	60-	60	59	59	60	60-	60	<b>5</b> 3-	59-	60	60	60	59	59	60	60-	60	53	53	60	6U	60	59	59	66	66	6D

SPEC 10-1 NTF BULKHEAD HATCH OPENING 0 18 SCALE DISPLAY= SY /1000 , NODE= 1 , SURFACE= 0

3	5	.2	į	}	2	-3	2	-5	-2	-2	-3	2	-2	-2	-2	-3	-s	-2	-2	-2	-3	-2	-2	-2	-2	-3	-2	-2	-2	-2	ខា	-2	-2	-2	2	-3	-2	2	2	2
2	2	2	2	}	2	-2	-2	-2	-2	-S	-2	2	-2	-s	-2	s	-2	-2	-5	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	လု	-2	-2	-2	2	-2	S	5	2	2
G	0	-1	-1		0	0	n	-1	-1	Ø	0	0	-1	-1	0	O	0	-1	-1	0	O	Ū	-1	-1	a	0	ū	-1	-1	0	0	0	-1	-1	Ū	0	Đ	-1	1	0

SPEC NTF BULKHEAL 10.1 HATCH ÖPENIN Q 18

DISPLAY= SY /1000, NODE= 1, SURFACE= 1

9	9	8	E	1	8	9	9	8	8	8	9	9	8	8	в	9	9	8	θ	8	9	9	8	в	8	9	3	8	8	8	9	9	8	8	8	9	9	8	8	8
1	1	1	1		1	-1	-i	-1	-1	-1	-1	Ľ.	L.	Ŀ	lî.	-1	L.	L	<u> </u>	Ŀ	L			<u> </u>			-1	-1	-1	-i	-1	-1	-1	-1	-1	-1	-1	-1	1.	
5	5	4	8		6	5	5	4	5	Б	5	5	4	5	6	τ	5	4	5	6	5	5	ų	5	б	5	5	4	5	6	5	5	4	5	6	5	5	ų	5	6

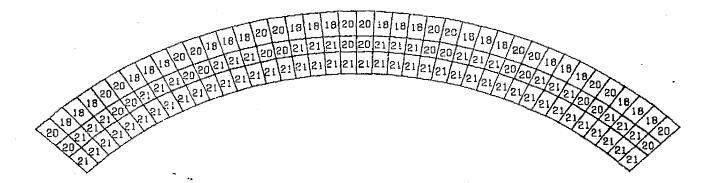
SPEC 10-1 NTF BULKHEAD HATCH OPENING 0 i8

DISPLAY= SY /1000 , NODE= 1 , SURFACE= 2

-	4	13	13	13	13	114	13	13	13	13	14	13	13	13-	13	14-	13-	13	13	13	14.	13	13	13	13-	14	13	13	13	13	14	13	13	13	13	14	13	13	13	13
F	4	4	-4	4	4	4	-4	-4	4	-4	-4	-ц	-4	щ	-4	-4	-ų	7	-ų	-4	-4 <u>i</u>	-4	-4	-4	-4	-4	-4	-4	-4	¥	-4	-ų	-4	-4	4	-4	7	-4	,	ч
E	5	5	-7	-7	5	5	-5	7	-7	-5	-5	-5	-7	-7	-5	-5	-5	-7	-7	-5	-5	-5	-7	-7	-5	-5	-5	-7	-7	-5	-5	-5	-7	-7	5	-5	-5	7	7	5

SPEC 10.1 NTF BULKHEAD HATCH OPENING Q 18

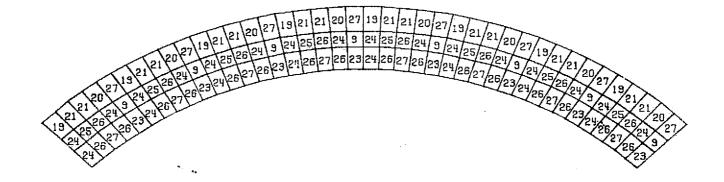
DISPLAY= SX /1000 , NODE= 1 , SURFACE= 0



SPEC

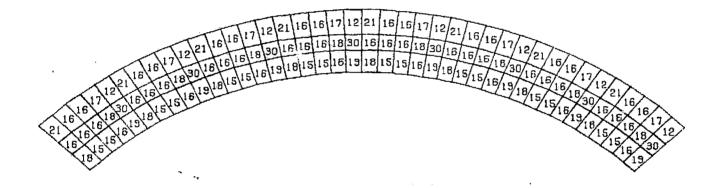
NTF BULKHEAD FLANGE SURFACE 0 <u>SCOLE</u> 21

DISPLAY= SX /1000 , NUDE= 1 , SURFACE= 1



SPEC NTF BULKHEAD 2.1 FLANGE SURFACE 0 <u>SCOLE</u> 21

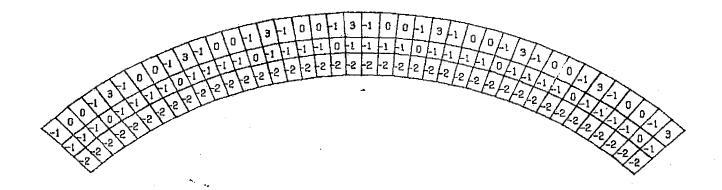
DISPLAY= SX /1000, NODE= 1, SURFACE= 2



SPEC

NTF BULKHEAD FLANGE SURFACE Q 21

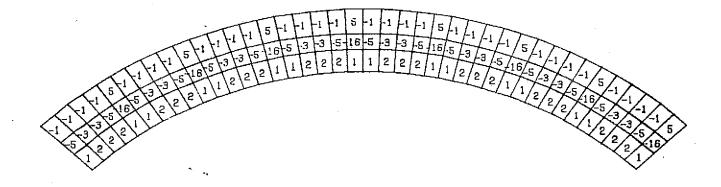
DISPLAY= SY /1000 , NODE= 1 , SURFACE= 0



ORIGINAL PAGE IS OF POOR QUALITY

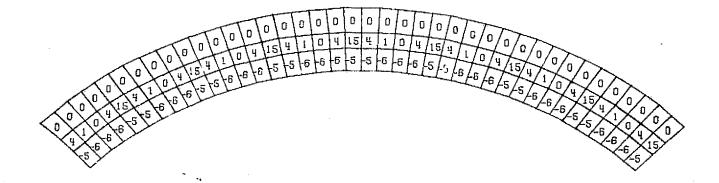
SPEC NTF BULKHEAD 2-1 FLANGE SURFACE 0 <u>scale</u> 21

DISPLAY= SY /1000 , NODE= 1 , SURFACE= 1

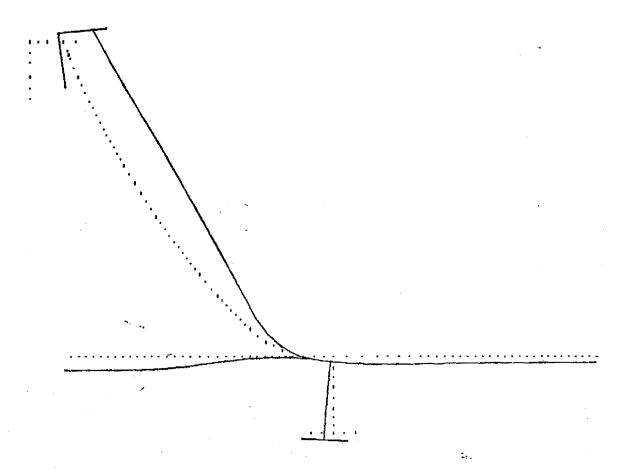


SPEC NTF BULKHEAD 2.1 FLANGE SURFACE Q SCALE

DISPLAY= SY /1000 . NODE= 1. SURFACE= 2

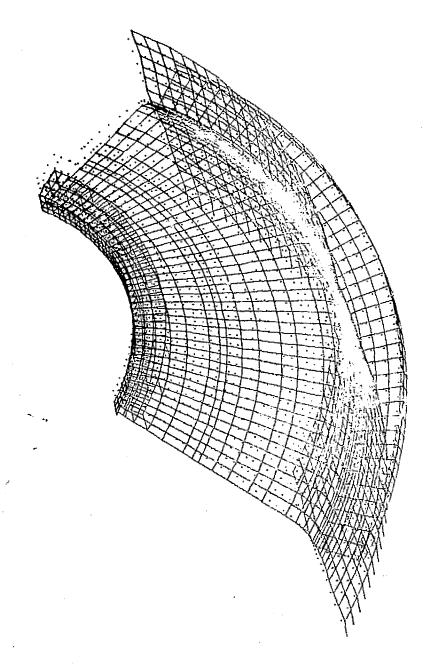


SPEC NTF BULKHEAD 2.1 FLANGE SURFACE 0 <u>SCALE</u> 21



SPEC 12·1 NTF BULKHEAD CROSS-SECTION VIEW ORIGINAL PAGE IS

0 27 SCBLE



SPEC NTF BULKHEAD 1.1 ..VALVE OPEN AND TEMP DIST Q 44 SCALE

BYDATE	SUBJECT	SHEET NO. DS
CHKD. BY DATE		JOB NO

## 54 \$ 55 Ring Analysis

Asymmetric Ring hoads

MAT'S 304 35

DATE		
क्षा हुंदु इस्ति तेतृ वृक्ष्म कित्री क्षित्र को क्षांत्रकृत कुछ व्यक्त कुछ कि का उन्		
K	)TE 54 & 55 RING ANALYSIS	
ز. دفت حدود هد	(304 4.5)	
1	DESCRIPTION	
	Computer Codes	
皿	Computer Model (OPPERATING) - 92	
	A. GEOMETRY 93	
en amparata.	B. LORDS 98  STRESS SUMMARY (OPPERATING) 99	
	<b>,</b>	
I	Computer model (Hydro) 100	
	Hy DROSTATIC PRESSURE STRESSES 101	
<u>UII</u>	STRESS SUMMARY (HYDRO) 102	
<u> W</u>	STRESS EVALUATION	

ORIGINAL PAGE IS OF POOR QUALITY

CHKD. BY...

BYDATE	UBJECT	SHEET NO. 70 OF
CHKD. BYDATE		JOB NO.

#### DESCRIPTION

Stresses in Subject Ring have been Calculated based on external loads Supplied by A/E. These Stresses have been superimposed on pressure stresses from a finite element model. The resulting combined stresses for both hydro and normal opperations are Considered, and the Stress evaluation follows. The ring as presently designed meets both the Stress criteria and: AISC Code.

YDATE	SUBJECT	SHEET NO. 9/ OF
HKD. BY DATE		JOB NO

#### INRING

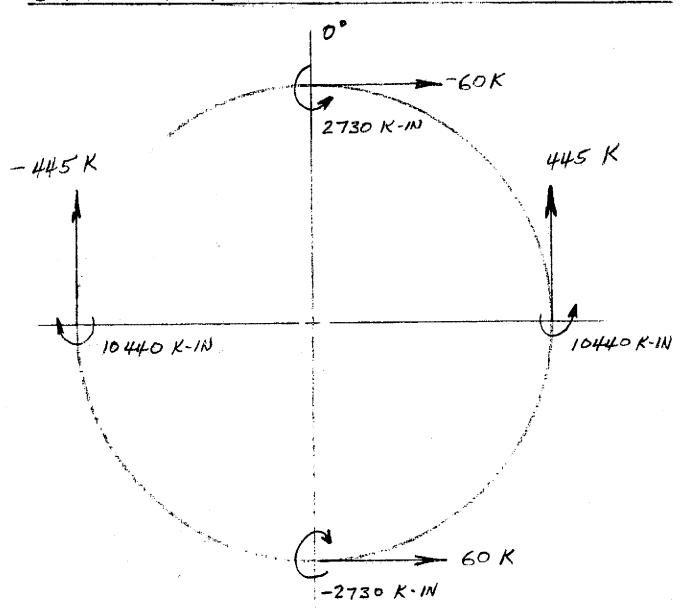
15 a time - Shaved computer program which performs a structural analysis of circular rings subject to loading in the plane of the ring.

#### SPAR

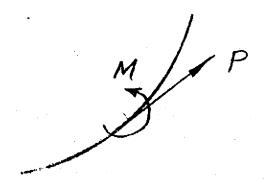
used to Calculate pressure stresses; from a full pressure cycle on a bulk head computer model.

BYDATE	SUBJECT	SHEET NO. 9 CF
CHKD. BYDATE		JOB NO

### COMPUTER MODEL FOR OFERATING CASE



SIGN CONVENTION

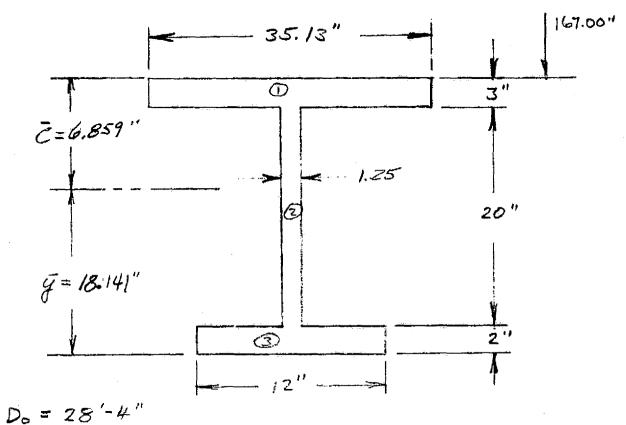


BYALLRED	DATE \$\frac{9/27/26}{27/26} SUI	3JECT	
CUPS BY	DATE		

SHEET NO. 93 OF \_\_\_\_\_

#### RING DESIGN FOR 304 S. STEEL

#### RING DETAILS



$$t = 3"$$

$$1.1\sqrt{D_0 t} = 1.1\left[(340)(3'')\right]^{\frac{1}{2}} = (31.94)(1.1) = 35.13"$$

WEIGHT OF STEEL AT RING SUPPORT

735 K

WEIGHT OF WATER & STEEL = 1846 K

OTHER LOADS, SIMILAR TO ROOKER'S

BY	 	DATE	SUBJECT

SHEET NO....OF.....OF....

#### CROSS SECTIONAL AREA

$$A = A_1 + A_2 + A_3$$

$$A = (35.13)(3) + (1.25)(20) + (12)(2)$$

$$A = 105.4 + 25 + 24$$

$$A = 15.4.4 N^2$$

#### CENT. LOCATION

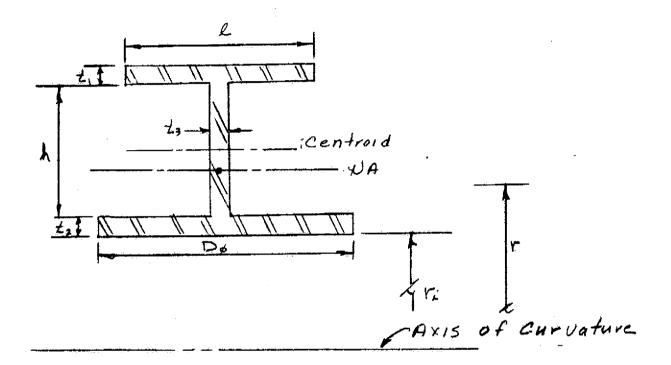
#### MOMENT OF INERTIA

$$\bar{I} = \underbrace{\int (I_1 + A_1 d_1^2)}_{J_2} \\
\bar{I} = \underbrace{\int \frac{1}{2} (35.13)(3)^3 + \underbrace{\int \frac{1}{2} (125)(20)^3 + \underbrace{\int \frac{1}{2} (12)(2)^3}_{J_2} \\
+ \underbrace{(105.4)(5.359)^2 + (25)(6.141)^2 + (24)(17.141)^2}_{J_2}$$

$$I = 79.04 + 833.33 + 8 + 3026.97$$
  
+ .942.80 + 7051.53

BY DATE	SUBJECT	SHEET NO. 75 OF
CHKD. BY DATE		JOB NO
		4===+=u=+=+=+=

#### BENDING OF CURVED BEAMS



Bending stress for Curve beams

Bending Stresses for a curved beam 15

M= moment

V= Stress point

F = centroid

A = AREA

R, for a "Tee"

$$R = \frac{t_1 R + k t_3 + Dotz}{\int_{r_i}^{r_i + t_2} \frac{t_3}{r_i} dr} + \int_{r_i + t_2 + k}^{r_i + t_3 + k + t_1} \frac{t_3}{r_i} dr + \int_{r_i + t_2 + k}^{r_i + t_3 + k + k + k} \frac{t_3}{r_i} dr$$

$$R = \frac{t \cdot l + l t_3 + D_0 t_2}{D_0 \ln \left( \frac{r_i + t_2}{r_i} \right) + t_3 \ln \left( \frac{r_i + t_2 + l}{r_i + t_2} \right) + l \ln \left( \frac{r_i + t_2 + l}{r_i + t_2} \right)}$$

BY DATE	SUBJECT	SHEET NO. 97 OF.
CHKD. BY DATE		JOB NO

#### GEOMETRICAL & MATERIAL PROPERTIES

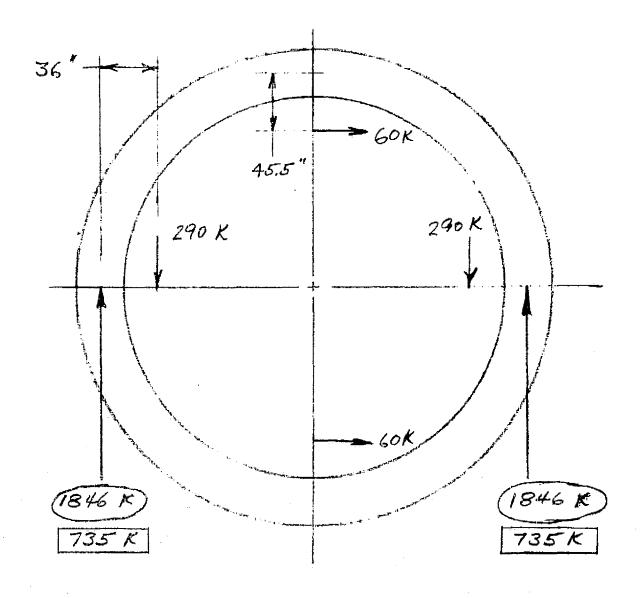
$$D_6 = 35.13''$$
 $E_1 = 11.941.7 \text{ IN}^4$ 
 $E_2 = 20 \times 10^6 \text{ psi}$ 
 $E_3 = 3.00''$ 
 $E_4 = 20 \times 10^6 \text{ psi}$ 
 $E_5 = 20 \times 10^6 \text{ psi}$ 
 $E_7 = 12.00''$ 
 $E_7 = 12.00''$ 
 $E_7 = 173.86''$ 
 $E_7 = 173.86''$ 
 $E_7 = 173.86''$ 

 $P = \frac{\text{NEUTRAL AXIS LOCATION}}{2 \times 12} + 20 \times 1.25 + 35.13 \times 3.00$   $35.13 \ln \left( \frac{167 + 300}{167} \right) + 1.25 \ln \left( \frac{167 + 3 + 20}{167 + 3} \right) + 12 \ln \left( \frac{167 + 3 + 20 + 2}{167 + 3 + 20} \right)$ 

R= 173.451" Neutral Axis

BYDATE	SUBJECT	SHEET NO. 98 OF.
CHKD. BYDATE	***************************************	JOB NO

## LOAD CONDITIONS

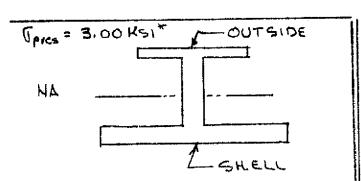


WEIGHT OF 304 S.STEEL

WEIGHT OF WATER DURING HYDRO.

BY DATE	SUBJECT	SHEET NO
		JOB NO

## STRESS SOMMANY (OPPERATING)



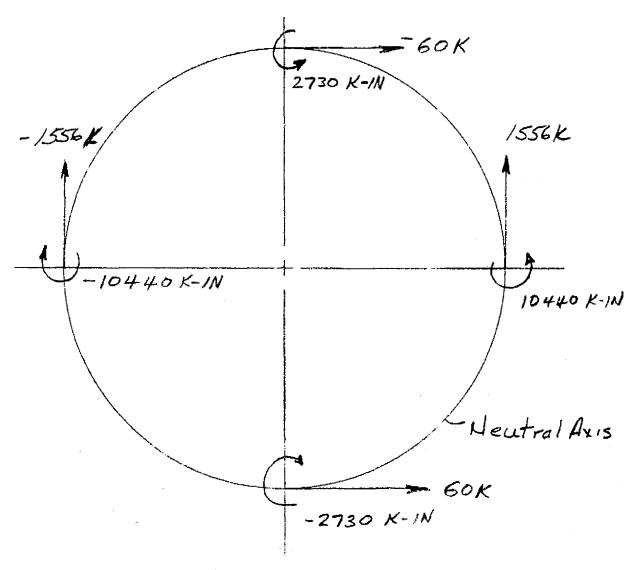
\* from Spar computer analysis

Opres = 5.38 ks1 \*

Opres	0.50	•						_
OUTSIDE (KSI)					Shell (KSI)			
reation	AXIBL	Bending	Comb	W/piess.	Bending	Combined	Combined W/ PIESS	Peak
0	4.05	-2.57	-2.16	0.84	1.02	1.43	6.81	
0	.02	1.61	1.63	4.63	64	63	4.75	
30	10	1.64	1,53	4.53	65	76	4.62	
60	. 65	, 07	58	2.42	03	68	4.7	
50	-1.3	-8.91	-10.23	-7.23	3.56	2,25	7.63	
90	1.57	7.06	8.62	11.62	-2.82	-1.25	4.13	
120	. 80	0 می	1,40	4,40	- ,24	,56	5,94	
150	,0	.75	. 75	3.76	-,3	-,3	5.09	
180	40	z. 57	2.16	5.14	-1.03	-1.45	3,95	
180	50.	-1.61	-1.63	1,37	.64	-627	6.01	
210	- 11	-1.64	-1.53	1,47	.66	.76	6.14	
240	. 65	07	. 58	3.58	, 03	. 68	6,57	
270	1,31	8.9	10.23	13.23	- 3.57	-2.25	3.13	13.23
270	-1.57	-7.06	-8.62	-5.62	7.82	1.25	6.63	
300	804	.60	-,21	2.79	Sir	-1.04	4.33	
330	009	-75.0	-84.03	2,916	, 030	150.	5. 40·	
ひむと	- 404	-2.57	-2.16	· 84	1.05	1.43	6.81	

BYDATE	SUBJECT	SHEET NO. 100
CHKD. BY DATE		JOB NO.

#### COMPUTER MODEL FOR HYDROSTATIC CASE



#### GEOMETRICAL + MATERIAL PROPERTIES

R = 173.457N to NA  $A = 154.4 N^{2}$  C = 18.55 N  $I = 11941.71N^{4}$   $E = 28 \times 10^{6} Psi$  $P = .283 #/N^{3}$ 

BY DATE	SUBJECT	SHEET NO. 101 OF.
CHKD. BY DATE		JOB NO

#### HYDROSTATIC PRESSURE STRESS

OPERATING PRESSURE STRESSES :..

3.38 KSI on Shell . 3.00 KSI outside fiber

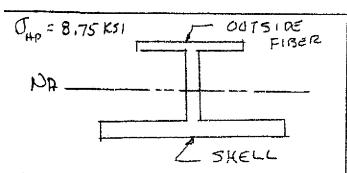
PH= 1.5 x 119 + 62.4 (41 + 23) = 193.45 PS:

5tress scale factor 193.45 1.626

1.626 x 5.38 = 8.75 KSI, on shell 1.626 x 3.00 = 4.88 KSI, out side fiber

BYDATE	SUBJECT	SHEET NO. 10 TOF.
CHKD. BY DATE	**	JOB NO.

## STRESS Summary (Hydro)



OHP = 4.880 KS1

# ORIGINAL PAGE IS

OUTSIDE FIBER (KSI)						Combined War		
L Oce flak	AXIAC	Benbine	Campined	Com Isined	Bending	Combined	Combined w/Prossure	
0	1.670	-18.000.	-16.352	-11,422	<del></del>	8.876	17.626	
0	1.281	-13,845	-12,564	-7,684	5,536	4.534	15.567	
30	1.290	-13.995	-12,706	-7.824	5,596	د.885 ک	15.635	
60	0.451	5.985	431	11.316	-2.393	-1.942	608.2	
90	-1.986	13,343	11. 777	1C. 257	-5,343	-7,336	1.420	
9,0	- 4,7.88	-1928	-6,714	-1.834	0,771	-4.017	ц.733	_
170	5.290	-1.929	3.340	8.240	0.771	6.061	14.811	
150	2.356	-14.531	-12/174	-7.294	5,810	8.166	16.916	-
180	- ,425	-,511	934	3.944	, 204	-,220	8.530	
180	-1.670	10.213	8.544	13.424	-4.084	-5,753	2.997	
210	- 1.281	6.037	4-754	9.636	-2.414	- 3,695	5.055	  -  -
740	-0.451	2.179	1.727	6.607	871	-1.322	7.428	
270	4.788	-/0.091	14.879	19.759	-4,035	0.753	9.503	
270	,5.290	,-5,879	-11.169	-6.289	2:351	-2.939	5,811	
300	- 5'688	6.722	4.366	9,246	- 2,688	-5.0,44	3,706	<b>-</b>
330	0.425	-7,297	-6.873	-1.993	2.918	3,343	12.093	
360	1,670	-18.000	-16.352	-11.472	7.206	8.876	17.626	

BY	DATE	SUBJECT	SHEET NO. 10 3 OF
СНКФ. ВУ	DATE		JOB NO

#### STRESS Evaluation

## Hydrostatic Test condition design Consideration.

at 0: 00

5,= 5.38 KSI (INSIDE FIBER)

57: 8.876

5, + 52 = 14,256 KS1 \( \text{.8 (yo (weld) = 24 ok}

Szf = 19.759 KSI (OUT SIDE FIBER)

52f < .9 Syp(weld) = 27 KS1

19.759 6 27,0 KS1 OK.

This support Ring (54 AND/OR 55) meet the stress Evaluation Hydrostatic Test Criteria.

ASME CODE

 $F_8 \le \frac{2}{3} F_y = \frac{2}{3} (30) = 20k51$ 

at 0=270° FB = 19.759 (OUTSIDE FIBER)

19.759 + ZOKSI OK